Commodore HORIZONS

The independent Commodore magazine

75p July 1984

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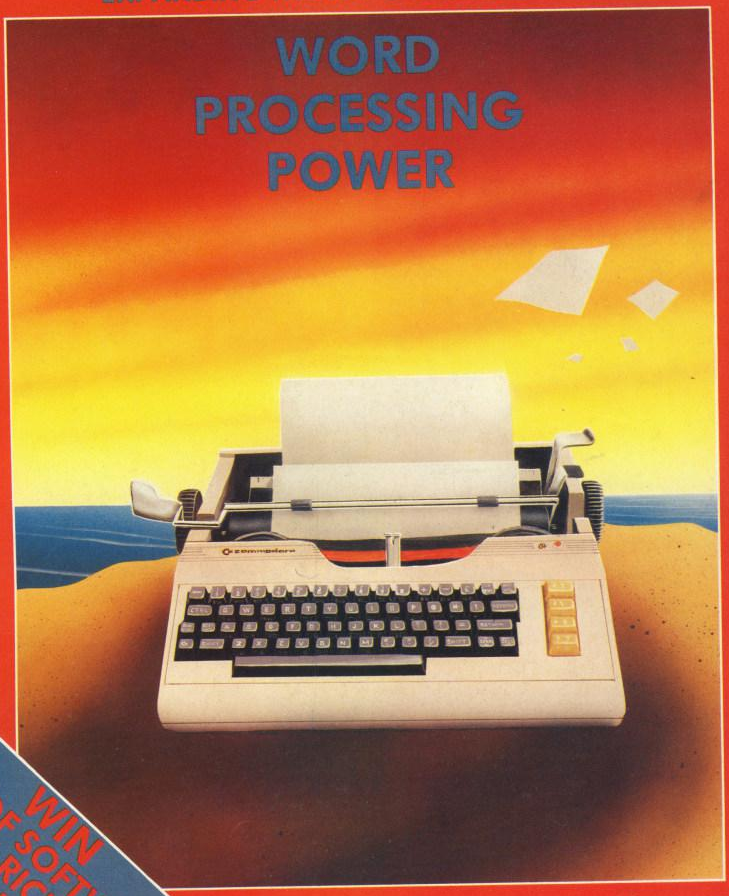
EXPANDING THE VIC ● GAMES GALORE

WORD PROCESSING POWER



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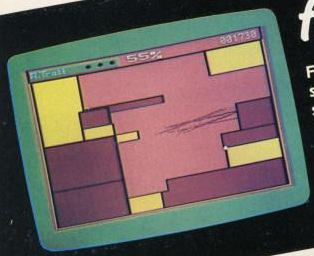
for games



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Commodore HORIZONS
The independent Commodore magazine

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SUNSHINE

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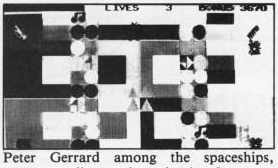

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EDITORIAL

COMMODORE IS OFTEN attacked for the facilities it does — and doesn't — offer on its micros. One such broadside came from Kevin Viney in a club newsletter earlier this year; Commodore's marketing manager John Baxter resisted the attack, managing to fire off a few rounds of his own in the company's defence. The exchange certainly made interesting reading. The ICPUG newsletter has already published the two letters, which appeared originally in the SE region's newsletter, but they are revealing enough to warrant a revisit.

Kevin began by pointing to the Pet's once premier position — and then explained how the specification for the BBC Micro, and the way that Acorn met it, dumped the Pet from pole position. "The Basic on the BBC model gave food for thought. It was faster, bigger structured and standard — no plug-in cartridges required here. Commodore surely boobed when the 64 arrived and we were stuck with yesterday's Basic. In fact neither that model nor the 8000 series came anywhere close to these new levels of performance." John Baxter chewed this over and came back with: "The Basic on the Commodore 64 was deliberately written to Basic 2 syntax in order to give compatibility with the large user base who still use Basic 2." But he added: "Some of your criticisms, however, are being addressed and you will see a much improved Basic on the 264 range" — the UK models in this range are now called the 16 and Plus 4.

Kevin continued: "Commodore and other manufacturers, though, seemed slow to appreciate the things that people were now getting for their money. Perhaps a brief reminder of some of them is in order." Kevin's list includes RS232 and Centronics options, built-in communications hardware, range of tv/monitor interfaces and a viewdata character set — certainly enough to start your mouth watering (or your keyboard fingers twitching if you prefer). Kevin argues that Commodore has fared badly "in all of the above respects". Over to John again: "Were Commodore to implement a machine with some of the BBC's better features, it would cost considerably more . . . The Electron is a cost-reduced version of the BBC but unfortunately has little of the main benefits of the BBC. Why? — because that would cost money." US analysts might argue that Commodore could build a more sophisticated machine and sell it for the same price as the 64. But you can't argue with John's sales figures: "In just six months total Commodore 64 sales in the UK exceeded the BBC machine sales by over 100%."

Kevin went on to ask: "Why then has Commodore apparently left the business and industrial/scientific community?" To which John answer: "We have a number of new machines coming which will be shown at the Hanover Show in April for the first time. Wait and see — I'm sure you will then agree we haven't abandoned, and will not abandon, the serious and/or business computer user." Enter, stage east, the CBM Z8000 Unix machine and the portable IBM PC clone.

If nothing else, the range of new machines Commodore is lining up, from the 16 at the bottom using Basic 3.5 to the Unix machine at the top, confirms the company's desire to compete in all areas of the micro market. But one of the main thrusts of John's argument, that "we make computers for the masses not the classes", may nonetheless lose impetus if the masses continue to get classier.

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(Adventure Int) — disk

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MULTIPLAN
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(Microsoft) — disk

Easy to use but very powerful spreadsheet. You can define cells by word labels rather than co-ordinates. Sorts columns or rows numerically or alphabetically. UK version £95.00, dollar sign US version at very special price of £65.00. Very highly recommended. Serial printer output. (Not VisiCalc compatible.)

CALCRESULT
£95
(Handic) — disk

Has true 3D (multipaging) facility, and histogram features. Versions for Commodore and Epson printers. This is a very powerful and much liked spreadsheet. Very highly recommended. (VisiCalc compatibility.) Single page version £47.50 (cartridge).

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Best of the lot. If you're into machine code — or working that way — this is the one to get or save your pennies for. Features 3-pass assembler, unlimited labels, source files can be linked, monitor, full screen editor, disk or tape operation. Plus AUTO, DELETE, FORMAT, FIND, NUMBER, DISASSEMBLE, OUT and TABLE. Monitor has standard TIM commands plus hunt, transfer and disassemble.

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HOME ACCOUNTANT
£53
(Continental) — disk

There are many home accounts programs, some cheap and cheerful, others — like this — are something else. This is the best home accouants program for the 64 — BUT IT IS CLEARLY SUITABLE FOR SMALL BUSINESS USE AS WELL. Features include 100 budget categories, monitor up to five chequebooks, bank reconciliation, and report on year's budget/actuals, balance sheet, net worth, income and expenses summary, balance sheet, all activities in given budget, and special 'field' reports (such as all cheques written within a specific category or to a specific party. Creates three kinds of graph — and much more. This may cost four times what a cheap 'bank statement' program, but you can measure its worth in multiples of ten! Very highly recommended.

THE LAST ONE
£97.50
(DJ 'A1' Systems) — disk

Programming aid that frees you from the graft if you're thinking of writing specific applications. Creates stand-alone error-free coding in standard BASIC. Input is in the form of one-line descriptions defining, in plain English, the user's intention. This word 'flowchart' act as basis of computer's questioning session which leads. Programs you create can be for any application but TLO is not really suitable for games! Highly recommended.

CODEWRITER
£85
(Dynatech) — disks

Database design system like TLO. Easier to work with but marginally less powerful. Disk 1 features data entry generator, disk 2 carries report and menu generator. Very flexible. Highly recommended.

SUPERBASE 64
£88.00
(Precision) — disk

Really excellent database generator, still at our special price. All things considered, we think this one's the best of its type and a must for all serious Commodore 64 users. Can be used for anything from mailing lists to stock control and invoicing. Lets you tailor the database to your exact requirements. Differs from program generators such as TLO and CodeWriter in that the systems menus and core program are always the same. But Superbase is not less the powerful for that — in fact it has database features and facilities beyond the needs of mere mortal folk!

FLIGHT SIMULATOR II
£35
(Sublogic) — disk

This is so good the authors think you can learn 'the ropes' as far as instrument control and flying are concerned. Accepting the limitations on the graphics side — nevertheless outstanding in terms of personal computers — the simulation is quite excellent. Expensive but it's the best one for the 64 by far . . . We do have cheaper flight and instrument flying simulators: SOLO FLIGHT, HELLCAT ACE, IFR (all on disk £25).

ZORK I/II/III
DEADLINE
STARCROSS
SUSPENDED
£27.50
(Infocom) — disk

This series of text adventures are the best that are available. NOTE OUR NEW LOW PRICE! Excellent selection of other adventures also available (see our list) including the splendid Level 9 series.

S.A.M.
£42
(Tronix) — disk

This is SOFTWARE AUTOMATIC MOUTH, a quite outstanding piece of software which gives your 64 limitless speech synthesis capability. Offers English text-to-speech or phonetic input, in direct or program modes. Full control over pitch, speed, inflexion. There really isn't anything like it, even on hardware!

M.U.L.E
£30
(Electronic Arts) — disk

A game in which up to four players attempt to settle a distant planet with the so-called help of a mule-like machine they all learn to hate. Now here's one to take the place of Monopoly — exactly what a 'board game' should be like on a computer. Very addictive.

COLOSSUS CHESS
£9.95
(CDS) — cassette

This is the best of the chess programs available for the 64. Cursor controlled piece movement. Turn by turn move listing and assessment. Multi levels of play. Game replay feature. A must if only to learn to play chess!

ACCESS/ BARCLAYCARD ORDERS: 0227 266289

LETTERS PAGE

Sticky symbols

WITH REGARDS to readers' problems with the Commodore graphic symbols, I have just purchased a self adhesive strip which can be stuck to your 64 or Vic 20, which details all the necessary programming symbols.

It's available mail order from LDS, 13 Highland Road, Wimborne, Dorset, BH21 2QL, and costs £1.95.

M J Burch
Eastleigh
Hants

Infodisk update

I WRITE to clarify a few technical errors that arose in May's article on data-bases. First, I should point out that, contrary to the table, Infodisk can search by field and record; further, modifications to the file structure are allowed as it is always possible to add extra fields up to the limit. When he wrote his article, Mike Watts was unaware that a number of improvements to Infodisk were under way so that the newest versions now have a four-field sort routine, together with the facility to support virtually any printer as a Centronics interface is now provided with the software.

Mike obviously has strong views about our manual style, but customer response has been very favourable. Clearly we are out of line with other software houses on our replacement policy, and we will be happy to drop our charging system from now on and supply customers with a back-up disk free-of-charge at the time of purchase.

Martin H Atkins
Beaver Software Systems
Stathern

Token gestures

EACH BASIC command has a unique token value, i.e. END(128), REM(143) etc. It should therefore be possible to POKE these commands into a program listing under program control.

I found that the first line of a program could be modified quite easily as follows:—

```
10 REM 12, 13, 14, 15, 16,
17, 18, 19
15 INPUT "TOKEN
VALUE"; N
20 POKE 2053, N
```

On running the sample program on a Commodore 64 you are requested to input a value. If 131 is input and the program listed you would find that it now reads:—

```
10 DATA 12, 13, 14, 15, 16,
17, 18, 19
15 INPUT "TOKEN
VALUE"; N
20 POKE 2053, N
```

This can be repeated with any Token number from 128 upwards.

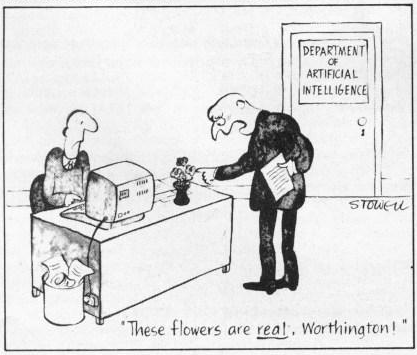
So what, you may ask, can we use this for? Useful dynamic changes that spring to mind could be:— (a) change to REM at beginning of line to temporarily skip the routines on that line. (b) change to DATA from REM — effectively generates a line of data that was not read before. (c) change to NEW — as a security measure if unauthorised use of program occurred. (d) change to STOP — halts program for debugging etc.

The uses are limited only by the imagination and of course the commands available.

I have tried this successfully on the following Commodore machines:— PET — POKE 1029, N : 64 — POKE 2053, N : VIC 20 — POKE 4101, N.

I am sure that with a little ingenuity, someone could suggest a way of altering *any* line in a program.

John Consadine
Ferriby
Humberside



Try for Tornado

AS A regular user of the Vic 20, I am constantly aware of the slowness in loading and retrieval of programs from the cassette unit.

I have read that the solution is to input a small program called Turbo (?) prior to loading, and loading will be 7 times faster. Can you tell me anything about Turbo?

B Lilley
Brighton

TURBO is a program used by games software house Anirog — but you can buy Tornado, which works with the Vic + 8K or the 64, from BSF Computer Services, 20-28 Bolsover St, London, phone 07988 240. Tornado costs £9.95.

V364 missing?

CAN YOU explain what has become of the V364, mentioned in your March issue?

There was no mention of this micro in the May magazine's article on the June CBM computer show. Could you clarify?

Secondly, the simplest way of obtaining a key repeat on the CBM 64 is POKE 650,128; and to turn off POKE 650,127.

John Moser
Whetstone
London

WE'RE STILL waiting for further news on the V364, and of course as soon as details are available we'll cover the machine in greater depth.

Chart success?

BEN ARROWSMITH said in your May edition that Commodore Horizons has two basic faults. I agree with him, I'm afraid — would it be possible to have a monthly chart for best selling Commodore software? Also, would it be possible to have ratings for new software releases, based on graphics, playability, value for money etc?

I hope I'm speaking for other Commodore Horizons readers.

Dee Lakha
London

LET US know what you think of these ideas.

. . . lastly . . .

SOMETIMES reverse graphics when printed in programs are extremely difficult to discern — particularly for the novice. The following solution works wonders; cut four straightedged strips of black paper and butt them against the edges of the printed symbols, completely framing them. In this way even the most difficult symbol becomes easy to read!

E M Smith
Colchester
Essex

This is the chance to air your views — send your tips, complaints and compliments to Letters Page, Commodore Horizons, 12-13 Little Newport Street, London WC2R 3LD

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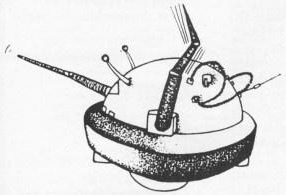

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NEWS DESK

All the news on the games front

Micro Power to the 64

MICRO POWER, a major producer of software for the BBC micros, is releasing its first batch of games for the 64.

There are four titles, which will be seen for the first time this June.

Micropower spokesman Christopher Payne said: "Each game will cost £6.95, and feature sophisticated music, graphics and sound effects. Some of the games are conversions of BBC originals, and at the moment we have programmers working on both the BBC and the 64 to develop further games."

The first four Micropower titles for the 64 are Ghouls, Felix in the Factory, Cybertron Mission and Swoop.

Ghouls is a four-level game set in a haunted house, in which you negotiate platforms and unsafe floorboards while avoiding assorted spooks.

Felix in the Factory finds you climbing ladders and leaping conveyor belts in search of fuel cans in a factory inhabited by monsters.

Cybertron Mission has 64 rooms each filled with dangerous robots — your task is to kill the robots and collect treasure.

Lastly, Swoop is an alien invasion game with a twist — the invaders lay eggs which fall to the ground and block the movement of your defending cannon.

All four games are joystick compatible, and feature a Powerloader fast loading system which is seen as a major selling point. "Kids don't want to wait 12 or 15 minutes for a game to load," commented Christopher, "so we feature the Powerload system prominently on all the new-style packages. Reaction from dealers has been very good so far, and we're hoping to do very well in the field of games for the 64."

GAMES software prices seem ready to drop sharply, as reported in last month's *Commodore's Horizons*. Following the lead of Mastertronic, which claims to have sold 150,000 of its £1.99 games in three weeks, Ace Software has cut its prices from £6.90 to £2.99.

Spokesman Micky Shephard said: "We anticipated cutting prices anyway, and in the face of Mastertronic's prices we decided to do it now. Like Mastertronic we are also in the video business, and we're developing the same outlets for computer games.

"Although we couldn't cut prices to £1.99, since all our games are specially written, we can compete at £2.99. We save costs by not using wholesalers or distributors. Since the price cut I'm pleased to say sales have shot up."

Ace's games for the 64 include Pigs in Space, Nite-rider, Mind Control and Krypton, and there's Quasimodo for the Vic 20. Further releases are expected in June.

On a contrasting note Atari, well known for the high cost of its games cartridges and cassettes, has announced a version of the arcade favourite Pole Position for the 64. The racing game should be ready by June, but the cost of the cartridge will be £24.99.

However, IG Programs of 23 Newall Tuck Road, Chippenham, Wiltshire, is offering the first of a series of double A-side games packs for the 64, and hopes to release a similar pack every two months. The first tape, costing £5.50, features an outer space shoot-'em-up called Galactica One, and a Boxing game for two players.

IG's Noel Pierce said: "The next pack should be ready in June, and will feature even better quality games. One of these will be a Zaxxon type with a 3D scrolling background. The games will be available direct from IG for the moment, but we're looking for distributors and more programmers so that we can expand."

Microdeal is to transfer many of its popular Dragon games to the 64. The Cuthbert series — Cuthbert in Space, Cuthbert Goes Walkabout, and Cuthbert in the Jungle, should now be available at £8.

Further titles include Arena 3000, a version of Robotron, Pengon, Grabber and Danger Ranger. There's also Snackman for the Vic 20. Certain of the programs will also be available on disk priced at £9.95

Durrell Software's next 64 game will be Combat Lynx, a sophisticated war simulation so detailed that the armed forces are said to be considering using it in strategy training programmes.

Taking care of business

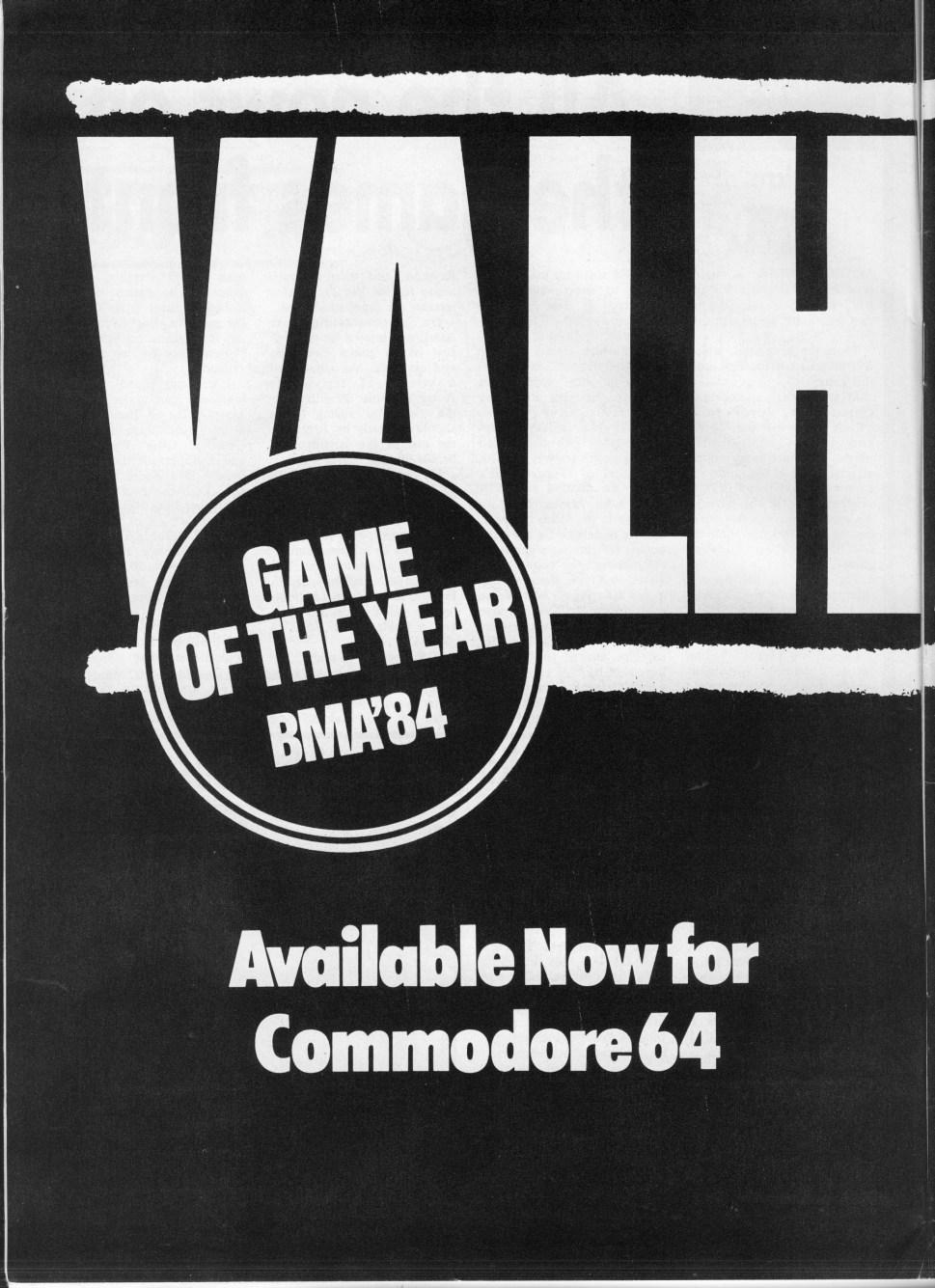
WHILE HOME computer users wait with bated breath for the release of the new CBM range — including the 264, now retitled the Commodore Plus Four — CBM has announced two new models in the business-type 8000 series.

The models are the 8296 and the 8296D, the difference being an optional integrated two megabyte disk drive. Commodore claims that no other manufacturer offers such large storage on a stand-alone floppy disk system.

The new models are compatible with the whole 8000 series software range. Price for the 8296 is £795 and the 8296D costs £1495.

The computers feature 128K memory, high-res graphics, an 80 column 25 row integral green screen and compatibility with a range of printers and disk drives.

The 8296D — one of the models replacing the 8032 and 8096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CH7

Coming up with the goods

COMMODORE International has reported record third quarter sales, net income and earnings per share for the period ending March 31st.

Chairman Irving Gould commented that "the primary contributor to Commodore's record results . . . was continuing strong sales of Commodore's microcomputer systems to the business, educational and home markets."

He went on to emphasise the success of the Commodore 64, and to note that he expected to see further growth in the remainder of 1984 and into 1985.

Meanwhile, Commodore UK has announced its latest set of software. Music Writer for the Vic 20 with 8K or 16K expansion converts the Vic's keyboard into a musical instrument. A stave appears on the screen showing the notes played, and a variety of different sounds can be produced. The program costs £4.99 on cassette.

In the educational field, there are five new programs for the 64. Hide and Seek, designed for 4-10 year olds, is a visual memory game which offers you four different ways of playing, with a series of graphic representations of everyday objects.

Let's Count teaches numerical skills for 5-7 year olds, and Face Maker develops visual accuracy. Words, Words, Words builds up pictures of scenes like a beach, farm or street, adding objects which are named by the child. The program is aimed at age ranges 5-8.

Forthcoming are Number Painter which is a maths game with a strong graphical element set on a building site, and Pathfinder which teaches spatial orientation through four different maze-type games.

On the recreational side, kids can relax after all their hard work with Arcade Extravaganza, which includes five games for the 64: Mayhem, Pandora's Box, Punchy, Little Icarus and Humphrey.

Vic and 64 get peripheral action

ONCE AGAIN this month sees a wide range of peripherals being announced for the Commodore machines.

JCB Microsystems has adapted the Dragon speech synthesiser for the 64. Managing director John Botibol explained: "The £34.95 speech synthesiser plugs into the cartridge port.

"Its 4K ROM adds four commands to CBM Basic — SAY, which causes the unit to say any one of 200 preset words; SPEAK, which allows the synthesis of new words through allophones; ADD, which allows these methods to be combined; and WAIT, which determines whether the computer pauses or carries on working while it's speaking."

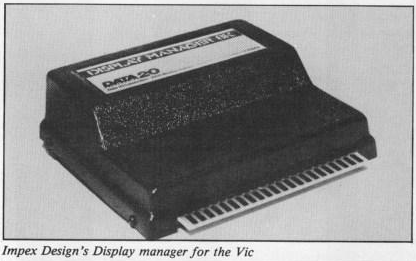
JCB is also working on a speech recognition system for the 64, which will either be used in conjunction with the speech synthesiser, or will reproduce digitised versions of your own speech. JCB has not yet decided which method is the more feasible, but hopes that the system will be ready by September.

Contact JCB at 29 Southbourne Road, Bournemouth. Bournemouth.

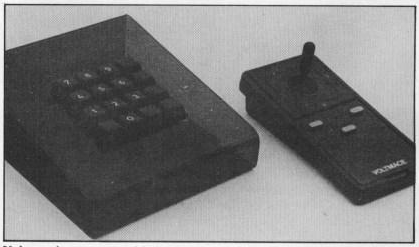
Voltmace has announced a 16-way programmable keypad and a joystick for the 64. The Datapad 16C plugs into the joystick socket of the 64, and comes complete with a program on cassette which enables you to specify the alphanumeric value of the keys. Keycaps will be available in a number of alternative designs.

The joystick, the Delta 3SC, is a rotary switched type with three top-mounted fire buttons. It has a sprung return and fingertip controls. The joystick retails at £10.00 and the keypad at £29.95. Contact Voltmace, Park Drive, Baldock, Herts.

Impex Designs of Metro House, Second Way, Wembley, Middlesex, has announced the Display manager module for the Vic 20. The module has 8K of ROM and gives the Vic an 80 column screen, terminal and communication facilities.



Impex Design's Display manager for the Vic



Voltmace's programmable keypad and joystick for the 64

At the same time the Video Pack 80 for the Commodore 64 is being released. It comes in the form of a plug-in cartridge with an 80 column screen expander and terminal emulator. The Word Manager and Plan Manager programs are included in the price.

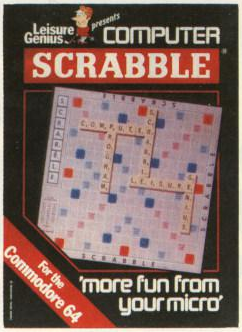
Cheap computer monitors are on offer from Doublemode which, with the help of a grant from the Irvine Development Corporation, has set up an assembly line converting ex-rental TVs into VDUs. The Doublemode VDUs are available in 20in, 22in and 26in screen sizes, and retail at £85 + VAT — a fraction of the cost of purpose-built monitors. Contact Doublemode at 16 Macadam Place, South Newmoor, Irvine, Scotland.

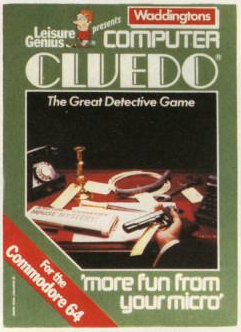
Lastly, the long-awaited CBM modem is now in the hands of some members of the users' group ICPUG. The modem, which comes as a self-contained cartridge for the 64 costing £99.95, is being evaluated before the full launch to iron out any hardware or network bugs.

Owners will eventually be able to access Prestel, Micronet, and Commodore's own Compunet. Charges to be taken into consideration include subscription fees, page access charges and line charges.

At the moment the modem can be obtained only from John Collins, Commodore UK, 675 Ajax Avenue Trading Estate, Slough, Berks. John, who is in charge of special software projects, commented: "The modem is fully operational as a viewdata terminal — many of the ICPUG regional organisers have one, and they are helping us to check the Compunet service before the full launch."

Ingenious...





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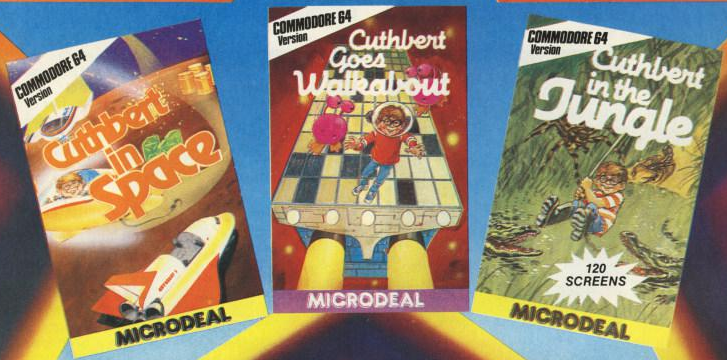
Cuthbert ON THE Commodore 64



Yes at last those fantastic top selling games for the Dragon are now available for your Commodore 64. Avoid those Marauding Moronians in "Cuthbert Goes Walkabout". Fight for survival in "Cuthbert in the Jungle"or plunder the Moronians planet in "Cuthbert in Space". These great games are a "must" for your software collection.

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Business and utilities arrive

BUSINESS and utilities programs are becoming more varied and unusual.

64 Doctor, from Micro Marketing Software, contains a series of diagnostic tests designed to pinpoint defects in the 64 system — whether the problem is in memory, keyboard, disk drive, joysticks, i/o port, video display, audio or printer.

At £17.95 on cassette and £19.95 on disk, 64 Doctor is claimed to save time and money when your system breaks down. The tests include on-screen prompts, and a manual comes with the system. Micro Marketing is at Goddard Road, Whitehouse Industrial Estate, Ipswich.

Honeyfold has repackaged and repriced the Dr Watson bookware series. The new editions now cost £10.50 for the Basic courses and £12.50 for assembly courses. Titles include 64 Basic Programming Course, Vic 20 Assembly Language Course, and the new Basic Adventures in Space. Contact Honeyfold at Standfast House, Bath Place, High Street, Barnet, London.

Romik's Multisound Synthesiser for the 64 has been released after some delays in production. All the musical capabilities of the 64 can be controlled using this program, which features a graphic representation of a music keyboard as notes are played. There are eight background drum patterns and definable background tunes. Contact Romik, 272 Argyll Avenue, Slough.

Lastly, Atlantic has produced two useful utilities for the neglected Vic 20. TOTL Label is a disk or tape program for the Vic plus 16K, used in conjunction with a printer to produce mailing lists or labels. Tape £11.95, disk £12.95.

Atlantic is also distributing the TOTL word processing programs. TOTL Text 2.0 is for the Vic + 8K, and is compatible with Commodore printers and suitably linked parallel and RS232 units.

For the Vic 20 + 16K, TOTL Text 2.5 adds more versatility through features like embedded footnotes, headings, footings, short-hand format commands, and merging of labels form address files created by TOTL Label. Contact Atlantic Software, 18B Thorpe Road, Kingston, Surrey.

US software crosses Atlantic

THE YANKS are coming — the latest wave of software is dominated by American games, which are being made available in large quantities for the first time in this country, by distributors US Gold and Softalk.

Centresoft is promoting its US Gold label, which features software licensed from Cosmi, Datasoft, Microprose, Access and others. Spokesman Jeff Brown claimed: "American software, while recognised as being of brilliant concept and quality, has been prohibitive in cost. We can now offer this software at between one-third and half of the original price."

Titles for the 64 include Forbidden Forest, Aztec Challenge, Slinky and Caverns of Khafka at £8.95 on cassette or £12.95 on disk; the simulation Solo Flight at £14.95 cassette or disk; war action from Beach-Head, £9.95 and £12.95; and a number of other arcade type games such as Bruce Lee, Pooyan, O'Riley's Mine and Mystic Mansion. Utilities include A&C Software's Textpro and Datapro programs.

Contact US Gold, Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands.

Meanwhile Bristol based Softalk has just released a new catalogue featuring over 100 titles on cassette, cartridge and disk for the 64 and Vic 20.

Softalk partner Tony Bigwood claims that 50% of these programs are unavailable elsewhere in the UK. "What we're offering is largely US software, backed up with product literature, which has previously only been available in London if at all."

The Softalk catalogue includes cartridge games like Choplifter, educational programs for the Vic, and a wide range of utilities and business programs such as Money Manager and Data Manager from Timework Software.

For the full Softalk catalogue write to 16-18 Princess Victoria Street, Clifton, Bristol BS8 4BP.

Changing media at the Palace

PALACE SOFTWARE, sister company of Palace Video, is releasing a game based on "video nasty" The Evil Dead on June 15.

The game, for the CBM 64, follows the plot of the film in which a group of teenagers, possessed by the spirits of ancient Sumerian demons, kill each other to the accompaniment of gruesome special effects.

Palace Software founder Pete Stone denies, however, that the game is a "Nasty". "Parliament more than anyone else has created a controversy over the film. I wouldn't accept that the film itself is a 'nasty', and in any case the computer game is not horrific at all. I don't think there'll be any controversy about the game itself."

The game has been under development for some time. "In fact when we started work on it the video wasn't controversial at all — we'd been thinking of writing computer games based on films for some time, and this just seemed like a perfect scenario, especially since Evil Dead was 1983's best-selling video cassette film."

"... who me, nasty?"

The Evil Dead and further Palace Software games will be available for a wide range of computers. "We're not tied to the 64, although at the moment all the development for our next games is being done on it. Having gained a lot of experience on the 64 we thought we might as well go ahead with it for the moment."

Although unwilling to commit himself to naming future software releases, Pete indicated that Palace Video holds the rights to a number of potential titles.

The Palace Video catalogue in fact includes such films as the French thriller Diva, David Bowie's Merry Christmas Mr Lawrence, and a number of other horror features such as The Texas Chainsaw Massacre, Halloween and Basket Case, as well as Palace Films' own production The Company of Wolves.

Reggae on, 64

*Rastas, plumbers, ants and Zylogons — **Pete Gerrard** shakes his dreadlocks at the latest games*

I SUPPOSE it was only a matter of time before someone produced a game where listening to the musical backing was significantly more interesting than playing the game. Such a program has now arrived in the form of **Jammin'** from Taskset, an unusual game for the Commodore 64, costing £6.90 on cassette, £9.95 on disk.

You are in control of a character called Rankin' Rodney, depicted on the cover of the cassette case as a Rastafarian Worzel Gummidge. Rodney has to be guided around a series of 20 mazes, collecting musical instruments as he goes, but all the time being on the look-out for bum notes, discord and distortion, which appear on the screen in an odd assortment of disguises.

Each maze consists of a set of different coloured squares, with a number of moving pavements scattered about. These pavements are also multi-coloured, and are used to transport you about the place, since you can only move on one colour at a time. To change colour there are a number of flashing diamonds moving about the screen, and by stepping on and off those you can go from squares of one colour to those of a totally different one.

The real highlight of this game, however, is its musical background. Some of the tunes played at the different levels are quite superb, although I can't see how the rendering of the old Status Quo number roll Over Lay Down on level 4 has managed to creep into this largely reggae-based collection of songs.

Still, it was good to hear it, and it makes a change from the usual explosions of the average arcade game.

But unfortunately for Jammin' it really is little more than an average game, albeit an unusual one. I found that Rodney was a difficult chap to control, and the game as a whole was irritatingly difficult. But if you want a game that's got a good soundtrack then listen out for this one in your local store.

Another one to look out for is the second program in our collection from Taskset, called **Pipeline**, again at £6.90.

Now I've nothing against long loading times on sunny days when you can set the computer going and go outside to turn slowly pink while the program loads. However, 12 minutes is a long time to wait when you've nothing else to do. Discover turbo drive, Taskset. (In fact they now have; see Profile-Ed.).

As with Jammin', Pipeline is a program that features a multitude of menu options at the start, although they can all be bypassed if necessary. Selecting the number of players, the type of musical accompaniment, and the starting level, are just three of the many things you can change about the game.

When you finally get started, the game consists of you controlling a plumber who has to rush around a pipeline keeping it open so that the water can get through. You have an endless selection of plumber's mates to help you out (referred to in the instructions as "Expendable, like Piers Letcher". What can this mean?), although like some plumber's mates you can't help wishing sometimes that they'd get on with the job rather than dawdling along doing nothing.

Lobsters

To make your task more difficult, there are a number of hazards, including lobsters and spiders who roam around eating your workmates, or indeed eating you if you're not careful. But your worst enemy is the evil ladder man, who runs up the side of the screen and along the top where, if you let him get that far without shooting him, he'll drop a plug into the pipeline somewhere and you and your mate will have to go along and fix it.

Some more good music accompanies this game, including a spirited rendition of The Floral Dance on level 4, and if you like interesting, playable games that are just that little bit different then you could do a lot worse than giving a hand with the plumbing and buying a copy of Pipeline.

Fire Ant sounds like an instruction from a rather bizarre adventure game ("what happens if we fire the ant at the troll?"), but is in fact an interesting game for the 64 from Mogul software.

This is essentially a game in the same mould if not the same class as arcade classics like Tutankamen. You, apparently, are the last surviving ant in a colony that has just been devastated by a group of rather nasty scorpions. Being the sole survivor, it's quite handy that the program gives you three lives in which to go about your appointed task.

That task is to rescue your queen ant, who's been taken prisoner and stored eight levels down in the scorpion stronghold.

Scorpions

After ploughing through the usual page of upper-case only instructions (what's wrong with using an insert, Mogul?), you discover that life is not going to be easy. Each level has three scorpions guiding it, and although these are normally slow and dull-witted, they can occasionally turn purple and rush round at great speed.

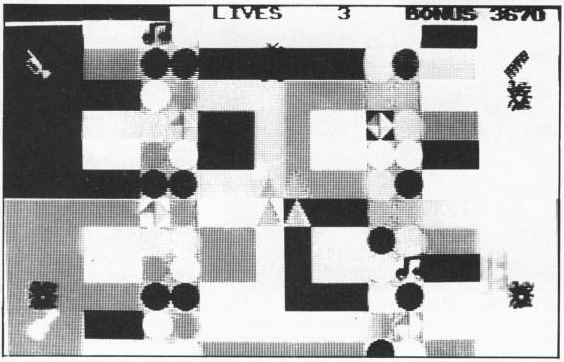
Also on each level are a number of doorways which you must figure out how to open. Some are obvious, as there are usually a couple of keys scattered about, but some are not, and you might well spend a great deal of time trying to figure out how to get past them, or even in some cases how to reach the things at all.

A good, if not a great, game. I'd have been more inclined to praise it if I'd never reached level 5, where what one must assume is a program bug rears its ugly head and renders further program impossible.

On that level are two special doorways which only open after a certain length of time and you've done a couple of other things beforehand. Under the right conditions the doorways will start shimmering, and with an impressive grating noise will vanish before your very eyes. Or rather, they would do if you did'nt get yourself killed at the precise time when one of them is starting the shimmering sequence. This causes the shimmering to stop, never to start again, and the doorway remains forever closed. As the exit from this level is beyond the doorway, there's nothing much to do except start a new game.

Apart from that, this is a competent, interesting program, that should keep you amused for a few hours.

Yet another new 64 software company springs up, in the shape of Allrian Data,



Jammin' — take a ganja at this, it's Haile enjoyable

among its opening efforts is **Alley-Oops.**

Alley Oops, at £7.99, is a cross between ten-pin bowling and Space Invaders. The action takes place along a series of bowling alleys, and you are in charge of a man who runs along the bottom of them bowling balls up whatever alley he happens to be standing in at the time, assuming you're pressing the fire button or spacebar.

Down the alleys comes a succession of objects, some useful and some deadly if not avoided. To score points you must knock down the groups of pins that continuously fall down the screen, and then maneouvre yourself to be standing in front of a symbol representing either a strike or a spare. This then fills in the next box on your scorecard displayed at the bottom of the screen, and getting ten strikes or spares will give you a handsome bonus and put you onto the next level.

However, there are many obstacles put in your way to prevent this happy event occuring. Chief amongst these are the beer bottles, which constantly rain down the screen, and from level two onwards you'll also get assaulted by pin sweeps as well (metal bars to you and me). Some sections of the alleys on later levels have spots of glue on them, and bowling a ball at this will have the inevitable happen: it gets stuck.

If you ever manage to work your way up to level 8 (I never got beyond level 5) you encounter the challenge round, where apparently you have to get a perfect score of ten strikes in order to win.

Well, one of these days I might make it, for Alley Oops is definitely a game to come back to again and again. All good, clean fun.

You've seen the advertisements for **Space Pilot,** now play the game. "Over 60K of machine code" boast the full page ads., and on seeing the program in action I can well believe it.

Biplanes

There are five basic levels to this game, which is based on the arcade game Time Pilot. The first one takes place in the year 1919. You are in charge of a plane roaming the skies looking for trouble. Out of the clouds come hundreds and hundreds of bi-planes, and before you can get past this level you'll need to shoot down 56 of them.

This is not the easiest of tasks, since a large part of your time is spent dodging out of the way of these bi-planes as they come at you from all directions. As the method of control adopted by Anirog involves turning your plane to the left or right, rather than just moving it in the direction the joystick's pointed in, this is difficult at the best of times. When they start firing back at you as your tally reaches the 56 mark it becomes well-nigh impossible.

Also charging about the skies are a number of parachutists, who can be picked up for bonus points. When you manage to get that 56th bi-plane, a large Zeppelin appears and starts gunning for you. Shoot this one down and you're onto the next level. This features Spitfires from 1940, which can move faster and mire more often than the bi-planes. And so it goes on, until level 5 sees some very determined space fighters from the year 2001. Unfortunately you're still stuck with the same old heap that you had on level one, and shooting 56 space fighters in that is not simple.

With some excellent graphics, and adequate sound, Space Pilot, at £7.95, is a very good and addictive program. Well worth a place in your collection.

Boasting the sort of name that is not meant to be typed out quickly, **Zylogon** from Big G software company is another space arcade game, but with some good use of 3D graphics it might well do better than most. Cost is £6.95.

Androids

Zylogons are apparently a race of sophisticated androids, whose very existence threatens us all with an awful fate. Being a space hero, survivor of countless battles in the depths of the galaxy, you've got to take your spaceship (yet another one that comes equipped with the latest weapons) into the heart of the Zylogon fortress and smash everything in sight.

The game takes place on a diagonal strip across the screen from corner to corner, and this strip is littered with old Zylogon rubbish. Anything that is on this strip can be shot at or dodged, although there are some sections which contain barriers to fly over, under or around. As your plane flies about a realistic shadow follows it on the ground, which is your only real indication of how high you're flying.

After a certain length of time flying on the strip the scene changes to a boring battle in space, although your ship appears to be still confined to the strip in terms of movement. This is a very ordinary affair, and it's hard to see why Big G bothered with it. It breaks up the routine of flying along the strip I suppose.

Dispose of a few aliens and it's back to the strip again, with more nasties to shoot at and more barriers to dodge. This seems to be the way the game progresses throughout: a section on the strip followed by a battle amongst the stars, with the two levels getting more and more difficult each time around.

As with so many games Zylogon is competent without ever approaching greatness. Based on the arcade favourite Zaxxon, it's better than a lot of other programs I've seen, but nowhere near that elite handful of what can only be called gems. 6 out of 10 for trying.

On now to the Vic 20 games. Running on the Vic with 16K expansion, **Bongo,** at £7.95, is another of Anirog's programs that is currently getting the full page colour advertisement treatment. Unlike Space Pilot, however, it doesn't really deserve it.

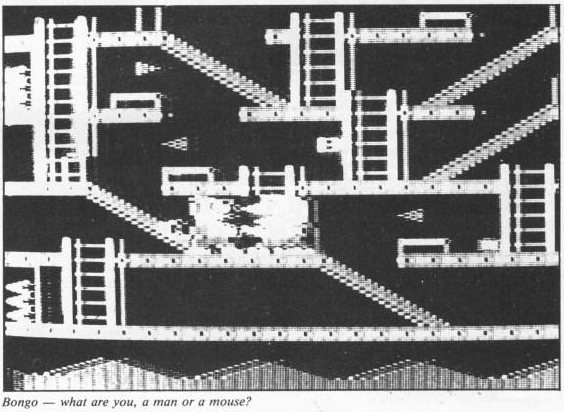
In this one you are in charge of Bongo the Super Mouse. Bongo has been a bit fed up of late, since he's set his heart on marrying the beautiful Princess who lives just up the road. But, being a mouse, he realises that his chances aren't that good, and so he has to resign himself to his fate.

One day he hears the town crier shouting that the King promises his daughter's hand (and presumably the rest of her as well) in marriage to he who finds the stolen diamonds. A bit rash, since she might end up marrying Bongo, who immediately on hearing the proclamation has rushed off to help find the stolen gems.

Monsters

Hidden deep in a cave he finds them, but alas they are guarded by extremely intelligent monsters who chase him about with uncanny accuracy. Your part in the game is to guide Bongo around the cave (i.e. the screen) and collect the treasures whilst attempting to avoid the monsters.

This is not particularly easy, since both Bongo and the monsters are very large and the Vic's screen is very small. Dotted around the cave are trampolines to jump about on, slides to move you rapidly downwards, ladders to move you slowly upwards, and a couple of transporters to take you from one side of the screen to the other. There is also a diamond, and if you manage to get hold of that another one appears, until you've managed to ▶



Bongo — what are you, a man or a mouse?

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◀ collect them all. At this point Bongo discovers that he's not going to get to marry the fair Princess, but is instead transported onto the next level.

The graphics are good, especially the sprite-like monsters and mouse, and there's plenty of levels of skill and different screens to keep the interest up, but I just couldn't work up any enthusiasm about this game at all. I can't see it living up to its claim that it will be 'a firm family favourite for a long time'. Not in this family it won't.

With the magic word Llamasoft written on the side of a cassette you can virtually guarantee that you're in for a good game, and the latest number for the Vic, **Hell Gate,** is every bit as good as anything else Mr. Minter has written for the machine.

Requiring a minimum of 8K expansion, Hell Gate is in the 'destroy everything in sight as fast as possible' mould, with one honourable exception. Don't shoot the goats!

Zzyaxians

Somewhere round about Pluto, as the story line has it, an evil force of Zzyaxians are expected to appear. Being clever chappies the Earth scientists have predicted precisely where this even will take place, and to give the Zzyaxians an unwanted surprise they've built something called the Hell Gate to welcome them with.

This consists of four tracks connected up in a square, on which run four laser heads. It is with these that you'll be giving the alien fleet their greeting. Controlling them and moving them about the sides of the screen is a little tricky at first, but is something that you soon get the hang of. Basically there are two master ships and two slave ones, and moving the ship at the bottom of the screen to the left will cause the one at the top to move to the right. Similarly, moving the ship on the left of the screen down will make the one on the right go up.

These laser heads have a habit of overheating if you fire too much, but they can be cooled down by moving the ship around. Consequently, games tend to consist of always being on the move and continually firing at the same time. The result? A screen filled with bullets, laser heads and enemy spacecraft all moving about at rapid speed and you, who are supposed to be controlling all this, utterly an completely confused.

From time to time a goat or two will run across the gate trying to reach the safety of the side. Don't shoot the goats, since they're worth a 5000 point bonus for every one of them that manage to make it.

With 20 levels of action (and according to the handout level 20 goes on for ever), this is another excellent piece of arcade action from Jeff Minter, that every arcade freak should have in their collection. Hell Gate costs £6.00 for the Vic, or £5 for the 64, but note that the 64 version is just the Vic version re-coded, and not a more complex game.

From Thorn EMI (under their Creative Sparks name), **Computer War** this is based on the successful film **War Games,** in which a young kid manages to tap into the American defence system and convince the defence computers that a real nuclear war is imminent.

In this £5.95 game, you have to convince the computers that they're not meant to be launching a salvo of nuclear warheads all over the place and restore peace to the world.

Requiring an 8K expansion, the program maintains two separate displays. The first one to be seen is a map of North America, on which can be seen a number of U.S. missile bases, and the site of the computer that's about to plunge us all into trouble. Also on the map are a set of flasing white dots and one black dot. The former are missiles aimed at the missile bases, and the latter is a missile aimed directly at the computer.

Missiles

Using either the keyboard or a joystick, you must move a cursor around this map until it's positioned over one of the flashing dots. When you think it's directly over one pressing the fire button causes the display to change, and now you get a view of the landscape around the base. This is the relatively easy part of the program.

The hard part comes with this second display, for you've got to find and track the missile around the screen and shoot it down. If you don't, the base you're guarding becomes active, and the threat of war that much closer.

Even if you do manage to shoot it down, your work still isn't over. The display goes back to the map again, and to the left of the map you can see that what appeared to be a randomly flashing set of lights have stabilised into a set pattern. There's one large stable display, 6 squares wide by 9 high, and one much smaller one that's just 3 by 3. In the large one is a 3 by 3 cursor, and the cursor must be moved so that the area it covers in the large display matches that in the smaller one, which will sometimes have to be rotated around, just to make everything that little bit more complicated. Since you've only got a very limited time in which to do this you've got to have a quick and agile mind. Failing to match the patterns will cause a new missile to appear on the screen.

A game with a lot going on, you've got to do a lot of work to prevent the war from happening. Plenty of varied action makes this one of the better games for the Vic 20, and proves that there's life in the old machine yet.

Another from Thorn EMI, **Tower of Evil,** also £5.95, is the latest in a long line of programs that are an attempt to combine arcade action with adventure playing strategy. As usual, your task is to explore a series of rooms (over 60 in this one for the 8K expanded Vic), picking up the objects to be found in them whilst at the same time fighting off monsters with fanciful names.

In Tower of Evil, your plot is to recover the stolen treasure of King Salimos and rescue his fair daughter Diana from the tower of the wicked Necromancer. A passing wizard has happily given you the ability to hurl fireballs from your fingertips, and with that as your only weapon it's off to the tower and on with the game.

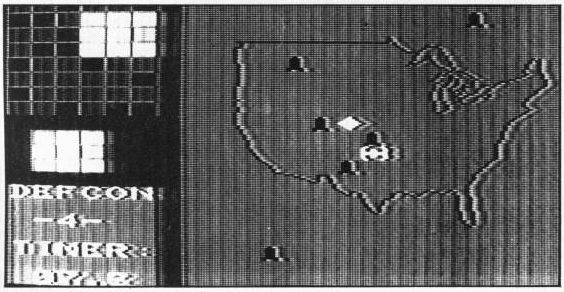
The objects that you're looking for are mainly treasures, although there are a couple of other items of interest on each level. One of these is a goblet, which can contain either Essence of Wild Volvus or Cigam. Grabbing this will either give you temporary invincibility or greatly increase your fire power in battles with aliens.

The other item is a key, which is essential for travelling between the levels. In one of the rooms is a magic stairway, which you can either descend or ascend depending on which way you push the joystick. The stairway can only be used sensibly when you've found the key, otherwise you have no control over where you go when you enter it.

The aliens are quite a vicious lot, and have names like Beelzebubs, Ashtaroths, Demi-clones and Baphomets, but they all seem to behave in the same way. Basically they're out to get you, and you have to have a quick hand on the fire button to do away with them.

Once you've found all the gold and all the keys, you have to ascend to the top level and open a treasure chest conveniently left there. Put all the gold into it, and a charming little Princess will run towards you, only to be spirited away and the whole game starts all over again.

The graphics are averagely well done without achieving greatness, and the use of sound is of the same standard. If you like this type of game you'll probably like this, but personally when you've seen one Necromancer you've seen them all. ■



Computer War — proves there's life in the old machine yet

The power of the processed word

Your 64 can become a supercharged typewriter once you add a printer and a word processing package. But which software to choose? ***Mike Grace*** *studies the field*

WORD PROCESSING — that magic art of manipulating text — is for me the ultimate reason for owning a micro. The ease with which words can be changed, spellings corrected, chunks of text moved from one place to another, and a printout obtained (which looks as good as your printer will print) is incredible. Uses for a word processor seem to keep cropping up, from the simple letter to the bank manager through to a comprehensive book of notes taken during studying (even just an evening class) or a carefully prepared speech that needs rewriting a dozen times.

It's the time saved that really counts — time that would have been spent on rewriting or drawing up a timetable again — time that can now be used for something else. But first impressions of using word processing are exactly the reverse. It can seem that the time spent on learning how to use your word processor far outweighs the time and effort spent in just writing out the thing in longhand in the first place. Like all skills, you have to learn how to understand and use the software first — and that does take time.

Power

Choice of software can thus depend on several features — partly the "power" in this context means how clever the software is and how many extra features you can use), the price of course, and the ease of use. You also need to consider why you want to word process, because that must affect your choice. In an article of this length I cannot delve any deeper into these factors, but if you would like to read more on the subject I can recommend my book *Home Applications on Your Micro* published by Sunshine Publications, which includes more detail on how to choose software and other related topics.

In this review I have taken 6 word processing packages for the 64 that span the range and tried to review them from the point of view of ease of use, ability and flexibility. The actual details of how each different package lets you move text, delete paragraphs and so on hardly seem pertinent in a review, as they are easily grasped by reading the manual — what the review should do (in my opinion) is try and compare how the software copes with the requirement of the purchaser.

Tape

All word processing software will allow you to add and remove words, letters, etc., and will allow you to print out your text. Most software includes underlining, tabs, margins, search and replace, etc. Again I have not spent too much time explaining these basic abilities, there has been plenty written elsewhere and again my book explains all these in detail.

Let's start by looking at some programs on tape. For the serious user tape is a little limiting (mainly because of the length of time it takes to load and save data) but for the casual user the low cost is a tremendous advantage, and allows you to discover whether word processing is for you or not without a large outlay. Also some tape programs allow you to save your text on disk (which is where the real time-wasting can occur) or even save the program itself onto your own disk when you buy a disk drive later.

Word Wizard, available from Bubble Bus, is the cheapest word processing I've seen so far at £6.99 — and for the price the program is quite remarkable.

What you get for your money is a cassette with a pretty label, the barest instructions on the reverse of the cassette label (like a game, but quite adequate for the experienced user) and the ability to write text, move it around and delete lines, set tabs, save your text (to both tape and disk) and print it out. I have an MPS 801 printer (the Commodore one replacing the 1525) and a Gemini 10-X (a dot-matrix similar to the Epson range) and to my surprise Word Wizard printed out on both without any effort.

But that's all. There is no provision for changing the margins, (this means the text is always printed out across the full 80 column width of the paper, which looks a little strange on a letter), you cannot do a search and replace, which is one of the most useful abilities of word processing, nor can you carry out any fancy printing such as justification, underlining or being able to centre text. But using the program is easy, and you have full control of your cursor so that you can edit text anywhere on screen. This is an important point I will return to — the ability to screen edit as you can do normally with your 64.

Database

So, an easy program to use, rather limited in scope, but good value for money. My main difficulty I found when using it was not being able to see the directory (in other words which documents I had on disk) but as it's obviously intended to be used with tape I suppose it's not surprising.

Home Office is really a database and a word processing program on one tape, (the word processing side is Wordpro) and as the price of the tape, booklet and attractive box is £14.95 then the price of Wordpro alone must be comparable with Word Wizard. It is marketed under the name of Navajo Software (complete with Red Indian) and distributed by Audiogenic, but I haven't seen it widely advertised in the press.

How does it compare? There is a very good basic manual containing enough information without confusing, and again

Table of prices.

WORD WIZARD	Bubble bus	£6.99
HOME OFFICE	Audiogenic	£14.95
WORD MANAGER	Impex Designs Ltd	Free (with 80-column card)
QUICK BROWN FOX	SPT Electronics	£60.00
PAPERCLIP-64	Kobra Micro Marketing	£89.95

you can save your files to disk or tape. Printing can be performed on either the 1515 printer (or later versions) or the epson MX-80 (the program contains an integral Centronics Interface routine so don't use your own) but no others — and it wouldn't work on my Gemini printer. Otherwise it is very similar to Word Wizard, being restricted really to just writing and changing text.

Good points are that for the price it will produce a better result than Word Wizard, because you can set the margins (they are preset at a very sensible level but you can change them), set tabs, and using the Epson print out using larger or smaller text, bold or double-strike (for 'letter-quality' print), append text and overwrite an existing file (this is very handy if you keep updating a file as you write it). You can also see the directory without losing the text in memory.

Editing

Bad points are the restricted abilities (but then it is very cheap) — but mainly the terrible procedure for editing. If you want to edit a word (say you've spelled it wrong) then you can't just move the cursor up and down the screen to get at it. Instead you have to scroll through the text until you find the word, note the number of the appropriate line, then call up the line. Then you have to rewrite the whole line, correcting the spelling mistake. And if you've missed out a word, just rewriting the line doesn't work, as now you have to rewrite the next line and so on until the end of the paragraph, (because each line needs extra space to accommodate the extra word).

I found this restriction a great handicap as it suppressed some of my creativity in writing (after all, it's such a fag when you want to change whole chunks of text and you end up just rewriting the whole thing — which isn't the idea of word processing).

For the price though it's good value — but of the two Word Wizard must be the better.

Word Manager is a unique little package from Impex Design (UK) Limited — unique in that the cassette is free, and that it works in 80 columns. When I say it's free — you do have to buy the 80-column Video Pak (which costs £145.95) to enable you to convert your 64 to 80 columns, but if you're interested in serious word-processing then 80 columns is almost a must.

So — if you're moving into 80 columns (by the way you also need a monochrome monitor which adds about £70 minimum to the bill) is this cassette package enough for your word processing?

The first thing I liked was the sticky-back strip containing all the controls which you can stick along the top of the 64 — so you don't have to keep looking in the book to see how to print, or move a block of text. Next in its favour is the fact it is definitely more powerful than the other 2 cassette programs, as you can centre lines, search and replace, underline sections or single words, merge documents, left justify and several other advanced functions. There is an extremely readable and short manual, but the best feature of all is the ability to see all the text in 80 columns — which is marvellous.

There are several more advanced features (mail merge, envelope printing) which I didn't actually use but looked a little limiting. The worst aspect for me was the fact that the text is contained in pages — meaning that all the text fits into one page, then if you need a longer document you have to start afresh on new page. Although you can link these pages together to print as one, I find the page restriction a "mind restriction" — in other words I find myself thinking of pages as I write, which isn't the best way for me. But if you're mainly interested in letters then this format is ideal.

Inserting text isn't quite as easy as on more powerful packages — but much easier than on both Word Wizard and Wordpro — and I liked the program. But if you're spending £145 to move into 80 column word processing — I would think it's worth your while looking at some of the better packages around. If you can't afford the more pricey software though (having spent £150 odd on the 80-column card) Word Manager will be more than adequate until you've saved up a bit more.

The quaintly-named **Quick Brown Fox** from SPT Electronics comes on a cartridge — which plugs into the cartridge port on the 64 and gives instant word processing. You can buy an integrated 80-column board which allows you to use the software in 80 columns (at a total cost of £194) or just the cartridge in 40 columns for £60. I found the latter (just the cartridge) a little strange, as the size of the print was as small as an 80-column print but only took up half the screen of my monitor.

Manual

The packaging is good, and the manual superbly bound in a plush brown folder, each page printed on ochre cartridge paper. Although easy to read the manual appears to have been written (extremely condescendingly) for the secretary and contains statements like "...your computer's Operating system (the great, green, hairy dragon of all programmes) ...". Not exactly an endearing style, I'd have thought, though amusing the first time round.

But what of the program itself. (Computer buffs will have noted the incorrect spelling of "program" in my quote from the manual, an example of the lack of awareness of the author).

Quick Brown Fox looks good on the screen because it prints out the text as it will appear on paper — you can actually see what you'll be getting. The program is pretty powerful, you can edit, insert letters and words, omit sentences and paragraphs, move text, print out reports, etc. It contains all the facilities any decent software would contain. Where it falls down in my estimation is in the ease of use.

Presumably because it has been inherited from another machine Quick Brown Fox is clumsy on screen-editing. In truth, it virtually has no screen-editing ability. This means that to remove a letter from a sentence (say you had spelled green as greeen) you can't just display the text, move the cursor to the word "greeen" and press the DELETE key. Instead you have to press 3 keys in View mode to see the text, then press a key to get into Edit mode, then try to remember where in the text the word is you wish to change and tell the computer. The appropriate line (you hope) will appear on the bottom of the screen, and you are asked if you still want to edit. If you press 'Y' you then have to press 'D' for delete (or 'R' for replace or 'I' for insert) and you still have to press another 3 or 4 keys to get your text back on the screen to view it again.

Hassle

This process is the same for moving paragraphs, find and replace, etc. The main hassle is that you never have the text on screen when you actually want to do something, so unless you print out your text first so you've got it to look at all the time it's hard remembering exactly the phrase or area to go to.

That apart, the software is good at actual performance — and it is powerful. It does do all it says it does, and well enough. But the complex and convoluted method of reaching the result seems a shame in view of the fact that Quick Brown Fox is one of the few packages that will run on 80-columns, and as such you'd think some-one would have rewritten the program to take advantage of the screen-editing on the Commodore 64.

Paperclip 64 is the ultimate in word processing. the package is so powerful that I've had difficulty trying to find something it won't do — from super and subscript (in other words you can write water as H_2O) to addition and manipulation of columns of figures (so you can design very simple spreadsheets). But the best aspect for me is the fact that Paperclip comes in 2 forms on the disk provided — a 40-column version and an 80-column version (although you still need an 80-column card to use it).

I've already mentioned the joy of 80-column word processing, but it has to be experienced to be believed. Once again, I will stress that 40 columns are quite adequate for the part-time user and many people learning on a micro get quite proficient at 40-column — because they haven't much choice. But using 80-column is *so* much easier because you can see the whole page of your text on the screen at one time.

Paperclip is marketed in this country by Kobra Micro Marketing and costs £89.95. It comes in a large presentation box which contains the disk, the manual and a dongle (which needs to be plugged into games port 1). Listing out the directory on disk shows an incredible number of programs, both the 40-column and 80-column versions, a backup program (to make your copy disk for use whilst the master stays safe somewhere — but of course the copy will only work with the dongle to prevent piracy) and a program for just about every printer on the market. Even if you have another printer Paperclip has a program to enable you to write a routine so you can use any printer. ▶

Facility	WORD WIZARD	HOME OFFICE	WORD MANAGER	QUICK BROWN FOX	PAPER CLIP
80-column facility			■	■	■
Append files	▪		■	■	■
Automatic pagination				■	■
Bold printing		▪		■	■
Centering a line		▪	■	■	■
Column manipulation					■
Copy paragraphs	■		▪	■	■
Counts the words					■
Delete text	■	■	■	■	■
Directory displayed		■	■	■	■
Document orientated	■	■		■	■
Global edit				■	■
Headers and footers				■	■
Insert text	■	■	■	■	■
Mailmerge			■	■	■
Maths facility					■
Move paragraphs	■		▪	■	■
Page-orientated			■	■	■
Right justification		■		■	■
Save to tape	■	■	■	■	■
Save to disk	■	■	■	■	■
Screen edit	■		■		■
Search & replace			■	■	■
Set margins		■	■	■	■
Sort facility					■
Super & subscript					■
Text formatted on screen.			■	■	
Underlining	■	▪	■	■	■

Table of Features: ■ means the software has this facility
▪ means the software does have the facility, but it is either very hard to carry out or you do not have full control.

◀ Both 40- and 80-column versions have exactly the same commands, so apart from the fact the 40-column can be used on your t.v. (rather nice colouring is used) and you need to change the line length to 40 whilst entering text (you can easily alter it back to 80 before printout) there's no problem. It is possible to leave the line length at 80 and type in text watching the screen scroll as you go, but I find seeing half a page extremely annoying when I'm checking for mistakes, etc. and would recommend setting all margins at 40 before starting.

Text is "unformatted", which means it is entered as one solid block and you have to use various commands to tell the printer how to layout your final version. This doesn't look as nice as a program which "formats" text as you go (like Quick Brown Fox). Moving text around is very logical, and involves only a few key strokes (completely the reverse of QBF), and of course you have full screen editing. All the usual commands are available (like search and replace, merge files, global edit, italics and underlining, etc.) One or two that I found handy are the automatic indentation of every paragraph (so you don't need to tab at every one) and the ability to define characters and phrases (in other words you can define the phrase "word processing package" as 8 and then type "8" for the appropriate phrase).

The manual is well-presented (although not as professional in appearance as QBF) and would appeal to a micro-owner more as it concentrates well on the simple procedures and has an extensive number of appendices with just about everything you'll need.

Paperclip is my selection — it has to be. At £89.95 it is remarkable value — but then it's for the serious user.

Skill

Word processing is a complicated skill that can only be aquired through practice and time — but the power it gives the user in being able to write well-constructed and presented work is amazing. The main advantage is the ease of moving words around, so any word processing software should also be considered from the point of ease of use as well as price and power.

As in everything you tend to get what you pay for. For the beginner and very part-time user, (or the person who wants to play around with word processing just a little) a cassette such as Word Wizard is ideal — but very limited. Home Office has the advantage of a simple database included, but the Wordpro program isn't as easy to use for text manipulation as you don't have screen-editing. Quick Brown Fox is really the secretary's word processing package, and looks better on screen as the text is laid out as it will appear on paper, but is infuriating to edit for a micro-user who is used to screen editing. Word Manager is more flexible to use (and being free quite a bargain) but as you have to buy the 80-column card it seems a shame not to go for a better program. Paperclip has the disadvantage of looking harder to learn at first (as you have to cope with more embedded commands — although you can take it slowly) but is much more powerful and in 80-columns really is as good as any other word-processor I've seen costing several thousand pounds, (and better than quite a few!).

I've tried to distill the essence of the differences between the programs for you — as there are plenty of extensive and exhaustive reviews of each program around in other magazines. But when you are unfamiliar with word processing a long and detailed review of which key to press to insert letters or delete paragraphs is pretty meaningless. But as with all things in life — don't buy your software without a demonstration and a chance to play around with it a little. ■

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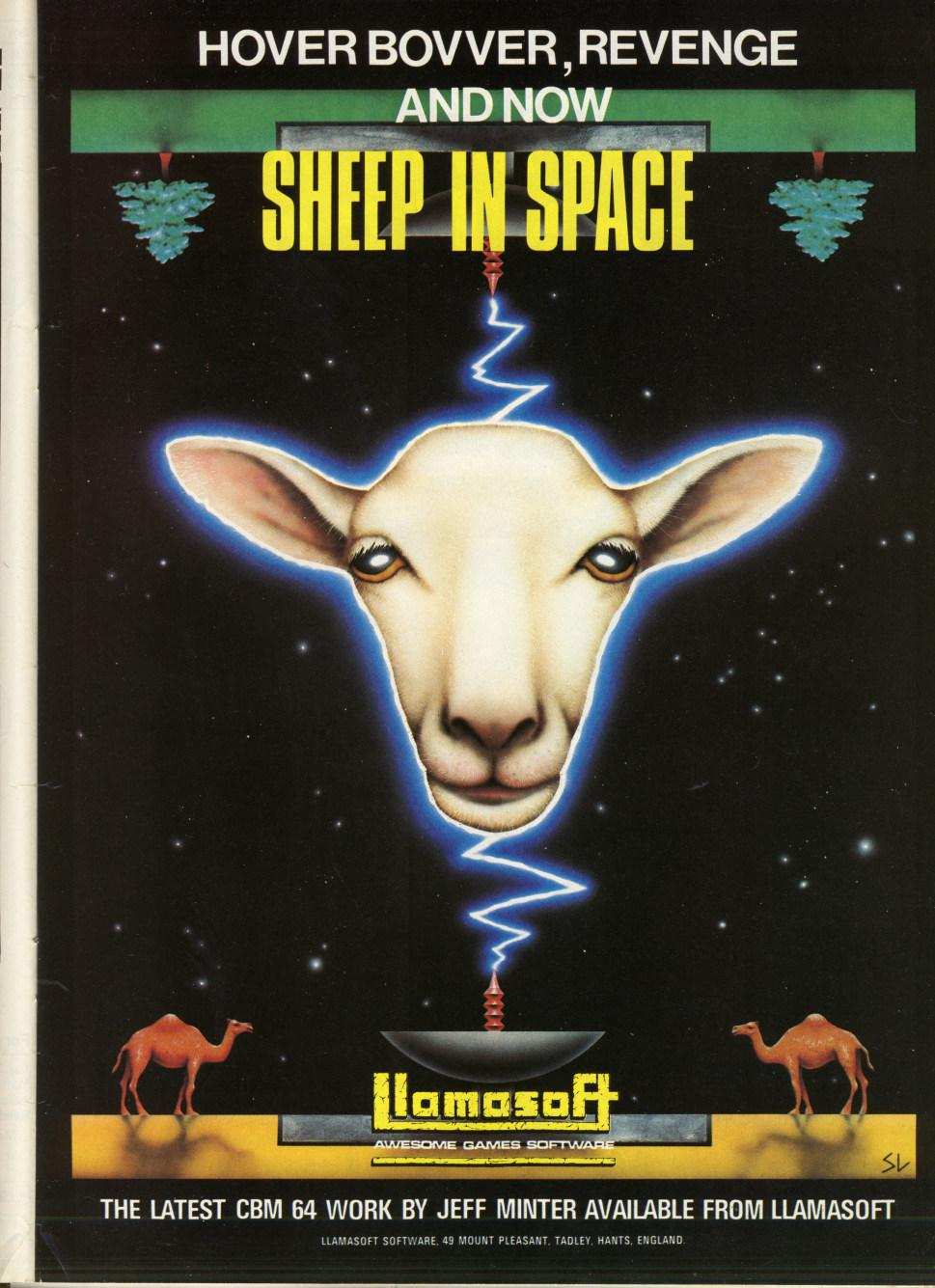
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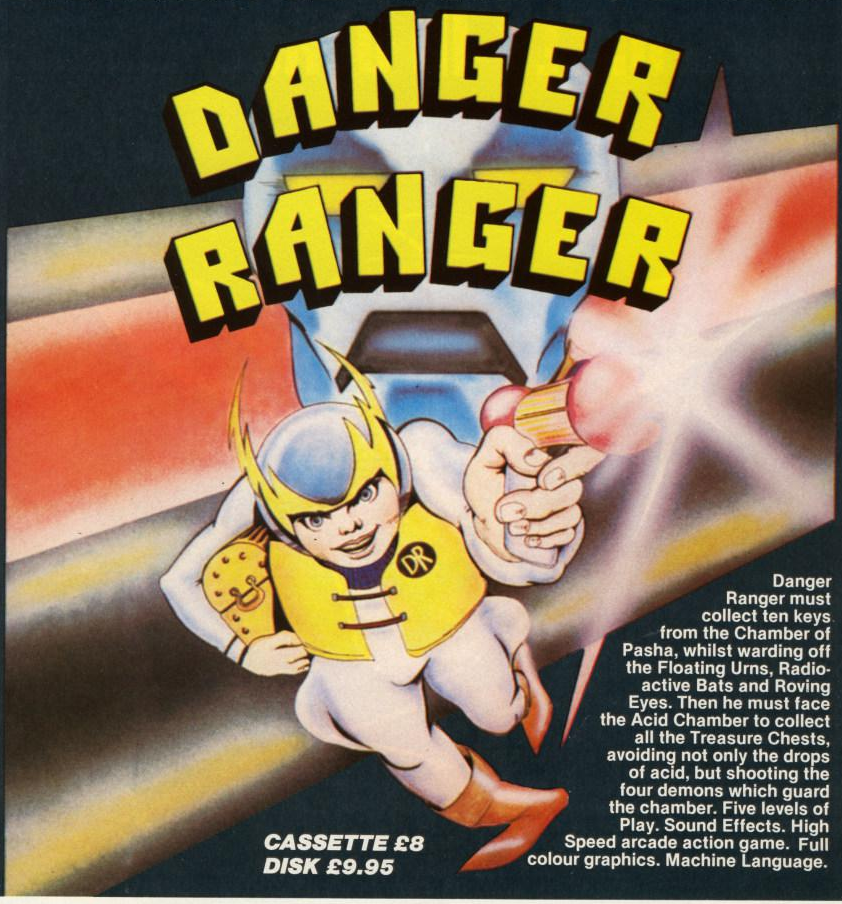

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Printers face up

Daisywheel or dot matrix? When it comes to choosing a printer you have to get it right first time. ***Ken Casemore*** *compares the Commodore MPS801 and the SCM TP1*

BOTH THE Commodore 64 and the Vic 20 have a wide choice of Printers available for them, but the least expensive and most readily available are the dot-matrix CBM MPS 801 and the daisywheel Smith-Corona TP1.

The Commodore MPS801 is a version of a Seikosha unit, costing £219, and is designed for the Commodore 64 and the Vic 20. Print size is 10 characters to the inch, and the 50 characters per second print speed is comfortable to work at. Printing quality is such that it is acceptable for most social and business purposes.

Although there are no descenders for g, j, p, q and y in business (lower-case) mode, they are the only letters affected out of 225 different characters. Reversed characters are available, plus the user-defined graphics you can create in graphics mode, plus the Commodore control characters. The expanded letter mode completes a formidable collection of printable characters on the MPS 801.

The impact dot-matrix system works well, and the machine is modern both in appearance and ease of handling in a working environment, where a variety of tasks are carried out such as listing, printing, editing with the screen-editor, changing and keying of programs, saving and loading, writing assembly language, merging and so on.

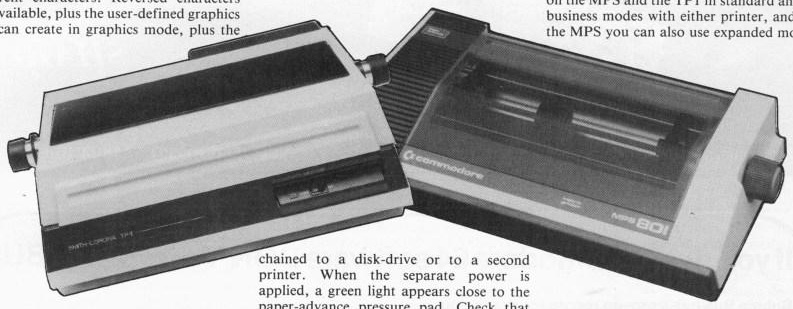
The excellent packaging allows the printer to be carried like a medium-sized suitcase as it weighs 11 lbs (5 kg). The ribbon is in a cassette that rides on the uni-directional print-head, and which has a re-inkable felt pad that can be replaced easily.

If you are unpacking an MPS, be careful to remove the protective foam strip from the paper-shelf as well as the sleeve that guards the guide-rod for the print-head. A thick foam strip permanently attached inside the printer must not be touched, as its purpose is to reduce noice which it does very effectively.

The tractor feed should be loaded with standard 9.5 inch wide paper: the width includes the sprocket-holes. Paper costs about £14 for 1000 sheets of single-part plain best-quality word-processor micro-perforated paper. The paper runs smoothly, and is easy to insert into the rollers even if the paper-thickness lever is not released.

If you read the manual carefully, and take your time, you should experience no difficulty in setting up the MPS. There are no expensive add-ons and everything is provided, so that putting the MPS into commission is fairly straight-forward.

The serial socket on the 64 is next to the datassette port, but the cable may be daisy-chained to a disk-drive or to a second printer. When the separate power is applied, a green light appears close to the paper-advance pressure pad. Check that paper is properly inserted and that the paper-thickness (touch-control) is in the middle colour-coded position. With the power switched off, put the indicator at the back to "T" for test and unplug the din serial connection. Now when you apply power, the green light comes on and the 801 will print out the character set until you stop it by pushing the switch from "T" to either number 4 or 5.



Buffer

The MPS has its own buffer and memory chip, just like all Commodore peripherals. The two device numbers, 4 and 5, allow two printers to be on line at the same time. Number 5 can only be used with an MPS: it cannot be used with a TP1 however, as that printer has to be accessed with 4.

To get started after setting up the 801, put the rear switch to 4 and key in the following short program. Remark statements need not be typed as they are only for your information:—

```
10 open255,4,0,:rem  file – device – mode codes: mode is standard
15 rem up to ten files may be in use simultaneously numbered from 1 to 255.
20 rem files numbered above 127 will give an extra line-feed.
25 cmd255: rem printer is "listening" for data. The same file no. is used.
30 print "Control of the printer from within a Basic program."
35 list: rem hard copy is printed.
40 Print "Type "RUN"":rem the printer will work according to the program."
45 Print #/ 255: close 255: end:
rem printer "unlistens" — control goes to screen.
```

This should serve as a useful introduction.

Before you rush out and buy a word-processor, try the TEXTEDITOR listed at the end of this article. It allows you to write on the MPS and the TP1 in standard and in business modes with either printer, and on the MPS you can also use expanded mode. Just follow the directions on the screen. Logo – shift will change the screen from standard to business mode and back again if desired. The menu lets you change to a different mode each time a new line comes up. An extra line-feed is given in line number 100, so should this be unnecessary, then just amend the program by keying in 100 rem.

A three-note "beep" warns you not to exceed the line length of 80 symbols. If you do exceed the length of the string, the program must be re-run.

Use the stop – restore keys should you get into difficulty: no creashes will occur.

If your intended use for your printer is for word-processing and business correspondence, you may prefer the print quality of a daisywheel machine — but remember that you will be unable to reproduce graphic command symbols.

The Smith Corona TP1 is a larger and heavier machine than the MPS801 printer. Although a tractor option is available at about £80, this is an extra cost for a machine that costs £250, plus another £50 for the Vicsprint serial to parallel interface-come-cable. TP1 was supplied with ▶

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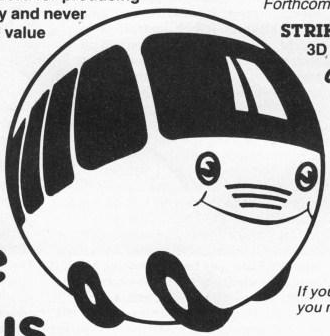

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The TP1 required to be fed with separate sheets of paper since it had friction feed only, and so it was necessary to watch for the end of the paper. The daisywheel gave correspondence quality, but the unidirectional printing was slow at twelve characters each second. A line space selector allows up to six lines spacing, and there is provision when using a tractor mechanism to press a switch on the front of the printer to feed paper to the "top of form".

Interface

You are warned against using tractor paper in the friction feed as it will go askew. A4 size paper may be used, as margins are initially set to this size.

To get started, switch everything off and then insert the parallel interface into the user slot at the back of the 64 on the left. The other end of the cable goes in the rear of the TP1, and the serial plug is connected to the 64 next to the cassette plug. Now pull out the serial plug and switch on the 64 first, then the monitor, and finally the printer, which will initialise itself with a fair amount of noise and a few "beeps" of sound that signal the setting of margins. The printer will produce most of its character set at this stage, and to stop it switch off the 64 and insert the serial plug to connect the Vicsprint properly.

After trial and error and much reading of the scant information given in the notes accompanying the Vicsprint the printer was operating.

The parallel interface needs a "clean" start, which means that it has to be fitted with all power off, as damage could be done if power is on and the plugs are not pushed in squarely: a "clean" start also means that the "black box" has to be fitted first as explained in the directions. Furthermore, a lot of trouble was experienced in using the printer which frequently "crashed". The TP1 manual did not give any guidance to using the machine from the operation of programming point of view, and it was necessary to rely on the very brief explanation of the interface leaflet and experience gleaned from other sources.

Thought

Eventually, a plan emerged to get the TP1 working but it is obvious that a lot of tyhough is required to master the machine! The procedure described below worked easily with the VIC20 computer but was temperamental with the 64.

After setting up the printer, the power was applied to all the machines, that is 64, television, cassette and printer. A disk-drive was not in use. A simple program was keyed in:—

```
10 A=9
20 B=6
30 stop
```

Then, in immediate mode,

```
OPEN 1,4,7: CMD1: LIST
```

```
1 REM TEXTEDITOR
2 CLR:PRINT"■TEXT EDITOR FOR THE COMMODORE MPS801 AND■THE SMITH-CORONA-TP1 ";
3 PRINT"- KEN CASEMORE 1984"
4 DIM$#(66):Z=1:PRINT"■UP TO 66 LINES OF 74 CHARACTERS ALLOWED.":S$(Z)="      "
5 G#="--------------------------------------------------------------------------"
8 G$=G$+"----------":REM GUIDE FOR TYPING
10 PRINTCHR$(13)"■EXPANDED MODE NOT AVAILABLE ON THE TP1.":PRINTSPC(30)"■■MENU"
12 PRINTSPC(5)"■STANDARD MODE"SPC(15)"1"SPC(11)"■BUSINESS MODE"SPC(15)"2"
14 PRINTSPC(5)"■EXPANDED MODE"SPC(15)"3"SPC(10)"■ FINISHED TYPING"SPC(13)"4"
20 INPUTC:ON C GOSUB 200,300,400,500
28 PRINT"■START TYPING. 'RETURN' GIVES HARD COPY."
35 PRINT"■■"G$:REM GUIDE LINE
40 GET A$:IF A$="" THEN 40:REM WAIT FOR KEYBOARD INPUT
42 IF A$=CHR$(20) THEN 80 :REM DELETE THE LAST CHARACTER
45 S$(Z)=S$(Z)+A$:REM BUILDING UP THE STRING TO BE PRINTED ON ONE LINE
50 BE=LEN(S$(Z))
52 IFBE=75THEN700
55 IF A$=CHR$(13)THEN 100:REM PRINTER WORKS WHEN 'RETURN' IS PRESSED
60 PRINT A$;:REM KEYBOARD INPUT APPEARS ON SCREEN
70 GOTO40:REM NEXT CHR
80 L=LEN(S$(Z))
85 S$(Z)=LEFT$(S$(Z),L-1):REM DELETED
90 GOTO 60:REM THE DELETED CHARACTER IS WIPED OFF THE SCREEN
100 S$(Z)=S$(Z)+CHR$(13)
110 PRINT#4,S$(Z)
120 PRINT#4,CHR$(15)
130 CLOSE4
140 Z=Z+1:S$(Z)="      "
150 RETURN
200 PRINT"■STANDARD MODE"
205 OPEN4,4
210 GOSUB 28
220 GOTO10
300 PRINT"■BUSINESS MODE"
305 OPEN4,4,7
310 GOSUB 28
320 GOTO10
400 PRINT"■EXPANDED MODE":OPEN4,4:PRINT#4,CHR$(14)
410 GOSUB28
420 GOTO10
500 PRINT"■"SPC(15)"■■■■■■■■■■■■GOODBYE■■■■■■■■■■■■■■■■■■■■"
510 END
700 BE=54272
705 FORB=BETOBE+24:POKEB,0:NEXT:REM CLR SOUND CHIP
710 POKEBE+5,9:POKEBE+6,0
715 POKEBE+24,15:REM MAX VOLUME
720 READHF,LF,DR
725 IFHF<0GOTO910
730 POKEBE+1,HF:POKEBE,LF
735 POKEBE+4,33
740 FORT=1TODR:NEXT
745 POKEBE+4,32:FORT=1TO50:NEXT
750 GOTO720
775 DATA32,94,750,25,177,250
795 DATA25,177,250,24,63,125
800 DATA19,63,250,-1,-1,-1
810 RESTORE:BE=0: GOTO55
```

was entered and RETURN pressed.

The printer responded by listing the program, but the screen was out of action and the printer showed "press play on tape" when a LOAD instruction was given. Although it was possible to communicate with the printer, the screen was impossible to access at this stage.

When the "OK" and the "searching" messages appeared, to be followed by the program name, the operation "crashed": the LOGO key or any others were not effective. It was found necessary to switch everything off and to start again. No doubt the difficulties were due to the serial to Centronics matching.

The TP1 has 88 different characters printable from the Commodore 64 keyboard. A £ sign is keyed as hash (≠/) and shift: both the left and up arrows, as well as the hash sign and all of the graphics, are not available, as only the characters on the daisy-wheel can be printed on the TP1. Neither is it possible to print in reverse. However, the daisy-wheels may be changed to get different type-styles, but the characters are essentially the same.

The printing is of correspondence quality, but it must be realised that the price for that is additional noise and expense. I would argue that many people are coming to accept dot matrix printing, as it associates itself with the computer world by its very style. However, the TP1 is an excellent choice if you insist on the higher quality to be gained from daisywheel printing.

In conclusion, I can only say that the MPS emerges as a clear winner in my opinion when used with the Vic 20 and the Commodore 64. There are several reasons for this decision. Firstly, it is less noisy and so reduces the strain on the operator. Secondly, the faster speed of 50 characters per second as against 12 is preferable. Thirdly, £219 is a lot cheaper than £299 plus £80 for a tractor attachment.

Furthermore, no interface problems arise, the character set is much more varied, weight is much less at 11 lbs compared with 20.7 lbs, paper feed is positive and trouble-free, and the size is smaller at 4.5x16.5x9.5 in inches compared with 6.5x19.5x13.5 inches for the TP1.

The manual is helpful and the instructions are good: the TP1 manual is of no help at all in the operation of the printer apart from general details.

I also found the MPS to be much more friendly in use than the TP1.

The program given works with both printers. It has a guide-line and a "beep" to remind you not to exceed the string – line length.

My thanks go to Martin Shoebridge and Richard Brown of Ram Electronics, Fleet, who kindly made available the Smith-Corona TP1 for this article.■

PROFILE

Is the Force with Taskset's Skywalker?

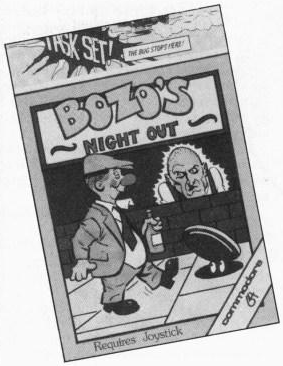
Or if not, what's the secret behind the success of Andy Walker's 64 games software company?
***Chris Jenkins** visits Bridlington to find out*

IT'S TAKEN some time for the software houses to take the Commodore 64 to their hearts. Many still rely heavily on converting versions of Spectrum games, often with no attempt to improve them. Even worse, many companies simply reproduce the same tired old variants of Pac-Man, Frogger and Space Invaders ad nauseam.

Zap! Kerash! Wallop! — enter Andy Walker and Taskset, fearless crusaders in the cause of original games and the lovable Commodore 64.

Taskset may not be the biggest or best-known of software companies — Andy Walker says he wouldn't want it to be, not under the Taskset name anyway — but it's pretty certain that most 64 owners will have seen and probably bought a Taskset game by Christmas.

Taskset's headquarters are situated in Bridlington, Yorkshire, a small seaside town kept going by the annual hordes of holidaymakers. "We're here for historical reasons," explained Andy; "I've moved around a lot in the last ten years, and somehow I ended up here. Once you get onto the motorway it's a reasonable drive to London, so we don't feel too cut off. One great advantage is that if someone comes to visit Taskset we know they really want to talk to us — they can't claim that they just happened to be passing!"



Andy's path into the games software industry was not a straightforward one. Though he might be described as a "whiz", he's no "kid" — his experience in the industry stretches back through many years involved in the arcade business.

Arcades

After a career working in government electronics departments, Andy gave in to his urges to write games programs and quit to move into the arcade business.

"It was a tough business and it finally fell apart because everyone went over the top. The time came when you'd walk into a pub, and there'd be two games machines; then you'd go to the chippie, and there'd be another one; you just couldn't get away from them. To make things worse everyone was ripping everyone else off. A lot of the companies who claimed to be producing games machines were just furniture makers — they'd buy one machine, copy the ROM, then churn out the cabinets with flashy artwork and someone else's game inside."

The lack of innovation which beset the UK arcade market rapidly knocked the bottom out of it. "Of course, another big problem was development costs. Your development budget could only be the amount of money you could afford to lose, because if an idea wasn't successful it would have to be completely scrapped. What the games designers would often do is to complete one prototype, ship it over to Miami and stand it in an arcade on a holiday weekend. They'd empty the coinbox and count up the quarters, and if it came to less than around $400 then the thing was a failure. There wouldn't be any question of just producing a few units — the American companies deal in thousands. There's no point in trying to pull the wool over their eyes with a bodged game — they've got to get their buying right."

Working for international corporations like Midway and Centuri, Andy gained a great deal of experience in what makes a game good to play. (Another

Andy Walker — "I don't see any sign of the games

acquisition was Andy's huge Chevrolet Camaro, which looks so out of place in Bridlington that its owner is recognised wherever he goes. "I was paid for one job in dollars, and I just couldn't resist the car. It's almost ten years old now, and I lost the radiator grille when I drove into a flock of pheasants, but it's still good for the image!")

Alas poor Oric

With the growth of the home computer market, it seemed a natural step to try to transfer that experience to a new field. "Some of the early work was done on a Superbrain system which had been dedicated to arcade projects. The first computer game Taskset actually produced was Dig Dog for the Oric, largely the work of programmer Paul Hodgson. It was written on a cobbled-together system made up of Oric, Commodore and Tangerine equipment, but we'll never try that again. The problems it produced were horrendous, and in any case the Oric was insufficiently supported — you couldn't get technical details for it. We never figured out how all the Basic worked, but of course that wasn't crucial since it was all written in machine code."

Two things put Andy off the idea of writing games for the Spectrum. "First, we left it too late; second, it's not really a games machine. The sound facilities are awful for a start; compare it with the 64's SID chip, which is good enough quality for the arcade industry."

software boom ending"

Having opted for the 64, Taskset went ahead with developing its first suite of games. "Again, we had technical difficulties with our development system. We opted for Commodore equipment, and worked it so hard that we were plagued with breakdowns. For instance, the 1541 disk drive is not designed to be used fourteen hours a day! We'd put in a week's work then find that all our files had been overwritten, and we couldn't salvage them. Obviously we needed something better, so we went in for a Sage system which costs about £11,000."

Having moved to new premises above a bookshop ("which the wife runs, so she can open it only when she feels like it"), Taskset got down to the hard graft of writing games. Andy explained how the development system works.

"The Sage system has a massive memory and integral disk drives. It also has multi-user capability, so we can generate code using a monitor/assembler we wrote ourselves and use the 'postbox' facility to communicate between terminals. The next task is to use an EPROM emulator to make the 64 think that this code is part of its own RAM. The principle's sound, but although the Sage is supposed to be 14 times faster than an Apple were still only about 75% happy with this system."

Between them, programmers Andy, Mark Buttery, Paul Hodgson and Tony Gibson, with artist Andy Rixon, have come up with some remarkable games using this system.

"Cosmic Convoy, which is remember almost a year old, featured a number of 'firsts' — for a start, you had to do more than just survive to win the game. Your space fighters have to protect a cargo convoy from attacking pirates, and although you may sacrifice some freighters you can't afford to lose them all. Secondly, you can have all of your three 'lives' on the screen at the same time, which is a feature you don't see much elsewhere."

Pipeline

Cosmic Convoy remains basically a shoot-'em-up, but other Taskset games take off into the realms of the extremely weird. Jammin' springs from Tony 'Gibbo' Gibson's interest in music, and the power of the 64's SID chip. "We wanted to do a game with good music, so we thought we might as well give it a musical theme. At the same time we had an idea for some sort of animated version of Ludo, and what emerged was Jammin'." You'll find a full review of Jammin' in our software review section, as well as Taskset's Pipeline.

"Pipeline was a game that came from actual experience. When we were in our old premises we sprang a leak upstairs one night, and narrowly avoided having our Superbrain soaked. That experience led to all sorts of ideas about little men running around knocking holes in pipes. We worked on the idea for ages before realising that it was a much better idea to have the men repairing the holes."

One game which Andy will not admit is based on experience is Bozo's night out. "We were falling about laughing at some of the ideas we had for this one — like a display showing a bladder filling up which you have to stop to empty on your way home from the pub. In the end we felt it was getting silly rather than funny so we cut a lot out of it. All the references to alchohol were replaced with 'wobble juice', although admittedly there are characters like G. Innes in the high-score table!"

Bozo

Bozo is very sophisticated in its handling of sprites and backgrounds, and some of the code which was developed for it may be used in further Taskset character games. Andy's understandable dislike for pirates and copyists stems from the effort put into the planning and writing of original games. "Not only have you spent months writing something, but you've sweated over the original concept and the debugging stage. For instance, when we finished Bozo we found that at one stage it was possible to make the character walk up vertical walls — not what we intended at all! It's a long process ironing out these bugs, and if someone avoids it all by taking your idea and rewriting it, they're making nonsense of that effort you put in. That's why you won't catch us doing versions of other people's games. We've got more ideas of our own than we've got time to develop anyway, so we're unlikely to buy in programs."

Andy believes that the customers who make copies of tapes for their friends aren't the villians of the piece. "It's just not true that every copy made means a purchase lost. At around £5.99 lots of people make copies because they can't afford to pay full prices. The real villains are the mass duplicators who run off 5,000 at a time, and the moves made to stop them so far aren't achieving much. Software Project's idea of putting a colour code on their inserts won't stop

people who own four-colour presses. We're involved in a couple of court cases at the moment, and hope this will set a useful precedent.'

Asked whether a cut in prices would deter pirates, Andy was doubtful. "I've seen some of the games put out by cut-price firms, and some of them are so bad they could use them in Bridlington Hospital instead of a stomach pump. OK, some of them are fair, but in any case I can't see the idea of cheap software lasting — if you're working with a normal dealer system where every step in the chain has to take a percentage, I can't see any way to keep going with these sort of low prices. We haven't changed our prices up or down since Taskset started, though if I thought we could get away with a price drop I'd do it tomorrow. Basically you need sales revenue to put into development costs, and although the production process won't get any quicker the games will be better — so in the end the punter will win either way. It's up to the buyer to ber more discerning too — you can't expect software houses to put on their packs 'This one isn't too hot but please buy it anyway'. It's worth reading reviews in the computer magazines, though if I was a kid I don't know if I'd be able to afford to buy all the magazines and still have enough money fo the software!"

Andy also had lots to say about overseas markets. "It's interesting to note how things vary from country to country. West Germany is very much disk based, the USA uses disk and tape but prices are higher, and the UK is very largely tape based. We're now putting all our games on disk, in fact we were one of the first companies to do so; but we're also using Pavloda, from Melbourne House, on our tapes. This makes tape loading times similar to disk loading times, so I don't see the advantage of having a disk drive unless you want to do major programming or use business software."

Apart from the in-house programming utilities Taskset is developing, Andy doesn't have much time for the idea of writing serious software. "You need a certain kind of mind to enjoy writing or using spreadsheets or databases. I just prefer games." Programmer Tony Gibson added, "I once wrote a word processing program and quite enjoyed it — but I'm happier with games even though I don't play them much. I just like looking over people's shoulders as they play, and my idea of a good game is one where you can get a lot of fun just out of doing that!"

Boom

Andy also mentioned that although he likes some adventures, such as The Hobbit and Level Nine programs, he can't see Taskset writing such programs itself. "There are already dozens of sub-groups of games: arcade space, arcade character, text adventure, graphic adventure, simulations and so on. It's getting more and more like the pop industry in fact, and as games become more sophisticated and more 'crossovers' occur there'll be lots of room for all kinds of different categories. So we'll just have to see.''

Whatever happens to the software industry, Taskset intends to stick with the 64. "I'm hoping in many ways that the new range of Commodore machines never take off. What they should do is keep the 64's memory map, add a proper printer port and change the Basic and operating system. We're using the Audiogenic Koalapad graphic tablet to help get over some of the screen designing difficulties, but the line editor is good and the *Programmers' Reference Guide* is a big help — it's a pity there isn't that much information made available for other machines.''

With the release of Gyropod, a sophisticated space arcade epic, and two more games on the way around the end of August ("Character games — I won't say more than that" Andy hints darkly), Taskset is determined to make a big splash before Christmas.

"Our reputation is built on a team effort, the burning of much midnight oil and a portfolio of varied games. There aren't any passengers in the company — in fact we're having to take someone on to deal with all the business aspects so that I can get back to some programming, which I don't have much time for at the moment!" Andy gazed longingly at his terminal, which looked dusty with disuse. "I'm going to take a holiday then look after the Commodore Show in June, then I hope to get back to programming some games. People have been telling me since 1981 that the games boom was over, but I don't see signs of it finishing."■

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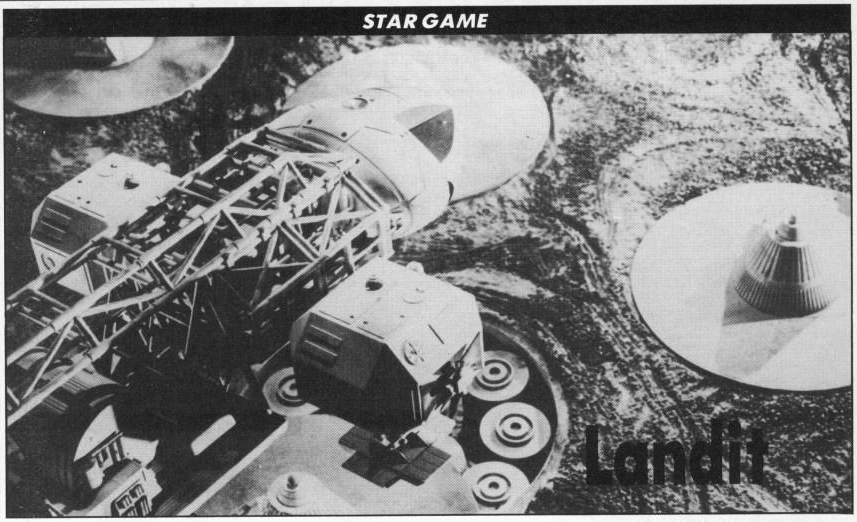

LANDIT for the Commodore 64 comes from Evan Williams of Newcastle.

The object of the game is to land your rocketship safely within 30 seconds. You have to avoid atmospheric debris during your descent, edge through the opening in the planet's surface, then negotiate the underground chamber in which your base is situated for safety reasons.

You have thirty booster rocket blasts available, but remember the time limit, after which your oxygen supply runs out.

The program uses three multicolour sprites as well as standard graphic characters. There is a short musical program included in the game too.

Use a joystick in port one. Note that the variables W (time) and FL (fuel) can be altered if you wish. The text written in graphics mode reads 1012 LEFT, RIGHT; 1013THRUST — FIRE BUTTON; 1014 GOOD LUCK . . . By Evan; 1015 Press 'S' to start. ■

```
1 REM**************LANDIT..BY..EVAN..(1984)**********************************
2 PRINT"□":V=53248:W=30:S=54272
4 GOTO1000
8 GOSUB700:REM********SET UP SCREEN*********************************************
10 PRINT"□":X=INT(RND(2)*100)+50:POKE53280,2:POKE53281,6:RESTORE
20 Y=50:L=1184:C=54272:W=30:POKEV+31,0:FL=30
30 FORP=1TO30:H=INT(RND(1)*320):POKEL+H,46:POKEL+C+H,7:NEXT
40 FORU=0TO320STEP80:POKE1214+U,46:POKE1214+C+U,7:NEXT:REM"■"=CTRL 5********
50 PRINT"■■■
```

```
224 IFX>250THENGOSUB400
226 IF(PEEK(V+31)AND1)=1THEN500
228 POKEWA,0:GOTO200:REM***************ROCKET FLAMES & SOUND****************
300 POKEV+21,255:POKEV+4,X:POKEV+5,Y+21:POKEF,15:POKEWA,129:POKEAT,15
305 FL=FL-1:PRINT"■■■
```

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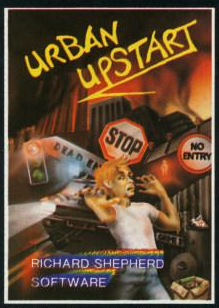

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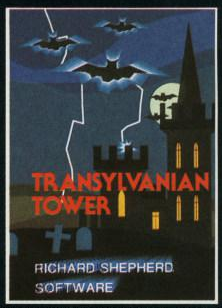

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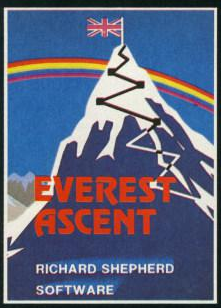

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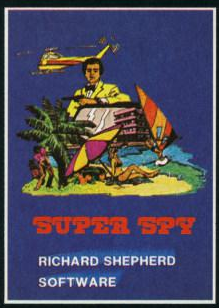

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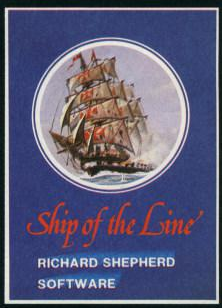

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Vic expander expounded

*Sound, peripherals, function keys and hi-res graphics with the Super Expander — **Colin Walls** explains*

THE VIC Super Expander cartridge was introduced by Commodore to make some of the more useful facilities of the computer more accessible. It could be argued that it should have been incorporated into the basic machine! Although it does not really *expand* the machine (except for the 3k RAM), it generally succeeds in its aims.

The only real problem is understanding what really can be done with the facilities provided. The manual supplied with the cartridge is brief, to say the least, and other references tend to be skimpy or inaccurate. This article aims to clarify some of the useful features of the Super Expander, rather than knock its short-comings. A general knowledge of the VIC and a familiarity with the Super Expander User Guide is assumed.

Sound

The SOUND command is a convenient replacement for the corresponding sequence of POKEs required to generate continuous sounds.

The music facilities are rather fiddly, and I doubt their usefulness in producing real tunes, but they are convenient for simple bleeps and tone sequences, since all the timing is taken care of.

It is not mde clear that the F character operates in a similar manner to RVS-ON. Since there is no equivalent to RVS-OFF, it remains active until a RETURN is PRINTed. This results in the following program fragments being identical (audibly):

```
1) PRINT "FABC"
   P R I N T ' ' F a p
2) PRINT "FABC";
   PRINT "ABC"
3 ) A S - = ' ' F a p
   BS- =ABC"
   PRINT AS- ;BS-
```

Note that the RETURN character, which must be used to exit from "music mode", is always actually PRINTed on the screen. This could easily mess up a nice display, if it caused a scroll to occur. Homing the cursor before making music is a possibility or, since the cursor control characters operate, a cursor-up could be included at the end of the music string.

Peripheral control is obtained through the RJOY, RPEN and RPOT functions, provide a very simple means of driving the devices without all the usual POKEs and PEEKs. This is particularly true with the joystick, since a silly mistake with POKEs can disable the keyboard! Note that the "fire" button value (128) is added to the direction value.

Function key assignment is quite a nice facility. The only thing I dislike is the initial assignments! In the manual it states that the KEY command can only be used in direct mode. I thought this was a shame and wondered why this restriction was placed on the command. I discovered, however, that the KEY command appears to work in programs with no problems. As a result of this discovery, I keep a couple of programs to hand.

This one resets the function keys to their original codes:

```
10 KEY 1,CHR$ (133)
20 KEY 2,CHR$ (137)
30 KEY 3,CHR$ (134)
40 KEY 4,CHR$ (138)
50 KEY 5,CHR$ (135)
60 KEY 6,CHR$ (139)
70 KEY 7,CHR$ (136)
80 KEY 8,CHR$ (140)
90 NEW
```

The second one sets up new strings which I have found useful:

```
10 KEY 1,"(clr)LIST" + CHR$ (13)
20 KEY 2,"MID$("
30 KEY 3,"(clr)RUN" + CHR$ (13)
40 KEY 4,"LEFT$ ("
50 KEY 5,"(clr)LIST"
60 KEY 6,"RIGHT$ ("
70 KEY 7,"GETK$:IFK$ =
   " + CHR$(34) + CHR$(34) + "THEN"
80 KEY  8,"(ins + )(ins + )(ins + )(ins + )
(ins + )(ins + )"
90 NEW
```

Keys 1,3 and 5 can be used where ever the cursor is on the screen. Key 7 is used to produce a "wait for key" statement; a line number is needed before and after the F7. Key 8 speeds up long inserts.

Hi-res

The high resolution graphics facilities really make the Super Expander worthwhile. Although all the functions could be programmed "by hand", it would be a lot of work.

The explanation of the graphics functions in the manual leaves a lot to be desired. I will try to give a clearer description of how the facilities work and throw in a few ideas of my own.

The manual talks about four graphics modes. There are only two really: modes 1 and 2. Mode 0 is the usual character screen and mode 3 is a funny automatic selection of modes 1 and 2.

If a program enters mode 1 or 2 the screen area shrinks slightly; it is set to 160x160 pixels. In mode 2 this gives 25600 individually addressable dots. In mode 1 horizontal resolution is reduced (because of the way multicolour mode works) by half, so only pairs of dots may be addressed. Actually addressing the dots is another matter! All the relevant BASIC commands refer to X and Y values in the range 0 to 1023. Why this range? Why not 0 to 159? Who knows? This remains a mystery. Obviously a translation between the two ranges is performed. Try this program:

```
10 GRAPHIC 2
20 FOR X=0 TO 1023
30 DRAW 2,X,0 TO X,1023
40 NEXT
```

It takes rather a long time to fill the screen, because not every DRAW actually draws a new line on the screen. In fact, since 1024 – 160 = 6.4, it is approximately every sixth DRAW which marks the screen. Add a STEP 6 to line 20 and the screen filling speeds up. Six is the biggest value you can use in the program and still completely fill the screen. However, the value of 6 is only a very approximate translation factor, since 1024/6 = 170.666, not 160. This is why the faster screen fill is a bit uneven and jerky. What is the translation formula then? Well, if we look for a convenient common factor then we get 160/5 = 32 and 1024/32 = 32. So we need a sequence of five numbers which add up to 32. It turns out that the sequence is 7,6,7,6,6 (hence perhaps the phrase "all at 6s and 7s"!). There is no theoretical basis for the sequence that I know of, it's just the way it is. Applying this new found knowledge, try this program:

```
10 I=0, X=0
20 GRAPHIC 2
30 DRAW 2,X,0 TO X,1023
40 X=X+6 : IF X>1023 THEN END
50 IF I=0 OR I=2 THEN X=X+1
60 I=I+1 : IF I=5 THEN I=0
70 GOTO 30
```

The screen is now filled smoothly. Lines 40 and 50 take care of the increments of 6 or 7 according to the sequence.

Table

How can this result be applied in real programs? Well, since we know the relationship between the two systems, we simply have to choose between calculating the conversion when required and looking up the result in a table. The former method is rather slow and the latter uses lots of memory. Isn't life awkward at times?

This function converts a coordinate in the range 0 to 159 to the range 0 to 1023:

```
DEF FNTF (X) = INT(X/5)*32 +
(X—INT(X/5)—5)*6 +
( (X—INT(X/5)*5)>0) —
( (X—INT(X/5)*5)>2)
```

Although it's rather fiddly, it does work. To use it just replace the X and Y which would normally be in the range 0 to 1023 with FNTF(X) and FNTF(Y) with X and Y in the range 0 to 159.

This code sets up a translation vector:

```
DIM TV%(159)
I=0 : TV%(0)=0
FOR J=1 TO 159
TV%(J) = TV%(J—1) + 6
```

▶

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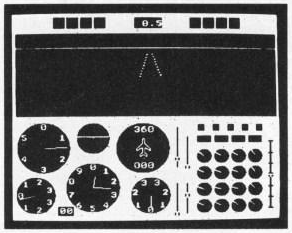

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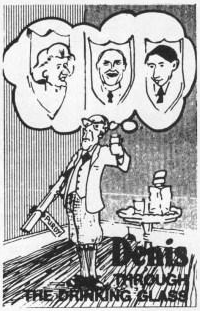

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◀ IF I=0 OR I=2 THEN TV%(J) = TV%(J) + 1
I=I+1 : IF I=5 THEN I=0
NEXT

Put this at the beginning of your program, then use TV%(X) and TV%(Y) like the function above.

Having said all this, a value of 6 (or 6.4 if you prefer) is quite adequate for lots of applications, but I'm a perfectionist (sometimes).

As a last comment on this particular subject, it is a shame that it was decided to do a co-ordinate translation without introducing a compensation (approximate, at least) for the assymetry of the screen. Using the techniques I have described, but with separate X and Y translations, a 240x160 matrix could usefully be implemented.

The CIRCLE command, though useful, has some oddities. To start with, as a result of the coordinate system (sorry, back to that again), an ellipse is produced unless you do something about it. The facility for drawing an arc of a circle is again useful, but odd.

The specification of starting and ending points is, according to the manual, in radians starting at the 3 o'clock position going clockwise. To the best of my knowledge (and my calculator's) there are 400 gradians in a circle (ie. 100 in a right angle), not 100 as they say. Really the arc length is specified as the percentage of a full circle (Why didn't they say so? Why not degrees or radians?). The 3 o'clock position seems a funny starting point (it isn't even during opening hours!).

Confusing

The CHAR command is also useful, but odd. Elsewhere, the fact that the screen is composed of 20 lines of 20 characters, each a matrix of 8x8 pixels, is conveniently avoided (the Vic thinks it's got 10 lines of 16x8 characters, but forget I spoke). This less than useful fact is resurrected for the CHAR command. The row and column are in the range 0 to 19 starting at the top left-hand corner of the screen. By having row specified before column, it means that you put Y before X. Confusing isn't it? It seems to me that CHAR has three constraints which are unnecessary and annoying: characters must be placed in cells on the 20x20 grid; characters must be horizontal and the right way up; and only 128 of the possible 512 (not all different) characters may be used.

My solution was to write a subroutine, listed below, which enables any character to be displayed anywhere. To use it, having entered GRAPHIC 2, set up the X and Y coordinates (X and Y, in the range 0 to 159) of the top left corner of the character (as viewed on the screen). Then set up the character code (CH) of the character to be displayed. This value is 0 to 255 for the capitals – graphics set and 256 to 511 for the lower – upper case set. Lastly set up the orientation (D) of the character:

0 = horizontal display, upright characters
1 = horizontal display, inverted characters
2 = vertical display, reading down the screen
3 = vertical display, reading up the screen

```
1000 X0=X:Y0=Y
1010 XS=1:YS=1
1020 IFD=1ORD=2THENX0=X+7:XS=-1
1030 IFD=1ORD=3THENY0=Y+7:YS=-1
1040 CC=CH*8+32768
1050 XX=X0:YY=Y0
1060 FORI=1TO8
1070 CL=PEEK(CC):CC=CC+1
1080 FORJ=1TO8
1090 IF(CLAND128)<>0THEN:POINT2,TU%(XX),
TU%(YY)
1100 CL=INT(CL*2)
1110 IFD<2THENXX=XX+XS
1120 IFD>1THENYY=YY+YS
1130 NEXT
1140 IFD<2THENYY=YY+YS:XX=X0
1150 IFD>1THENXX=XX+XS:YY=Y0
1160 NEXT
1170 OND+1GOTO1180,1190,1200,1210
1180 X=X+8:RETURN
1190 X=X-8:RETURN
1200 Y=Y+8:RETURN
1210 Y=Y-8:RETURN
```

FIGURE 1.

Then call the subroutine (Figure 1). It is a bit slow and only does one character at a time (I suppose a machine code version is possible), but you pays your money . . . .

In addition to those set up before calling the subroutine, the following variables are used:

X0,Y0: coordinates of the top left-hand corner of the character, corrected for orientation.
XS,YS: coordinate step value (+/−1).
XX,YY: current coordinates
CC: address of current byte of character cell.
CL: byte of character cell.
I,J: loop counters.

Note that the existence of the translation vector (TV%, as above) is assumed, but a conversion to use the function FNTF is easy. I experimented with an approximated fixed step (6), but it introduces significant distortions. By the way, the X and Y values are updated on return from the subroutine to point to the next logical screen location. This makes repeated calls very simple.

Using the same technique as this subroutine, it would be a straightforward matter to develop a different character set. Other character formats (eg. 7x5 pixels) could then be tried; this would enable an alternative number of characters per row and column, if required.

Graphics

Now a final point on the subject of Super Expander graphics. In the manual it says that nearly all the commands may be executed in direct (immediate) mode. This is true, but not very useful, because the screen management has been bodged. Type this:

GRAPHIC 2

You now get a clean high resolution screen. Now type:

CIRCLE 2,512,512,399,300

carefully, since you can't see what you are doing (you could set up a function key with this string). An ellipse should appear, as expected. Now try typing a few cursor-downs. In due course the picture is broken up. This is because the system is trying to scroll the low resolution screen which you can't see! Unfortunately that's the way it is and you can't do anything about it.

The Super Expander Basic commands may be abbreviated in the usual way. Here is a list of the abbreviations together with the BASIC token values:

Command	*Abbreviation*	*Token*
KEY	kE	204
GRAPHIC	gR	205
COLOR	coL	210
POINT	poI	211
REGION	reG	209
DRAW	dR	208
CIRCLE	cI	207
PAINT	pA	214
CHAR	chA	213
SCNCLR	sC	206
SOUND	sO	212
RGR	rG	219
RCOLR	rC	218
RDOT	rD	221
RSND	rS	217
RPOT	rP	215
RPEN	rpE	216
RJOY	rJ	220

As a parting thought it's worth highlighting that if a Super Expander command follows a THEN, it must be preceded by a colon

eg. IF X>0 THEN : POINT 2,X,Y

This is mentioned in the manual, but it doesn't leap out of the page at you!

If all the above has put you off the Super Expander completely, you might be interested in some useful POKEs and SYSes:

SYS 64850 — kills the function keys
SYS 58232 — kills the Super Expander commands

or if you're really sick of it:

POKE643,0 : POKE644,30 : SYS 64824

converts the Super expander into a 3k RAM pack!■

PROGRAMMING

Mouse power

***Adrian Warman** presents his mouse emulator for the 64, "Shrew"*

THE RELEASE of the Apple "LISA" computer, and its new cousin, the "MacIntosh", has resulted in the realisation that there is a huge market for software that make interaction between User and Machine as easy as possible. In the case of these two machines, this is achieved by the use of a device known as the "Mouse".

A mouse (in computing terms, at least!) is a hand-held device that operates on a flat surface, such as a table-top. As the mouse is moved across the surface, sensors within the device detect the motion, and send corresponding signals to the main computer. These signals are decoded and used to move a cursor on the screen. When a button is pressed on the casing of the mouse, another signal is sent, instructing the computer to look at whatever is underneath the cursor (often a picture representing a task — called an "Icon"), and act accordingly. In this way, tasks can be easily selected, without ever pressing any keys on a huge, unfriendly keyboard.

The whole concept is delightfully simple, and is very popular.

Sprite

At present however, no similar facility exists for the Commodore machines — particularly the CBM 64. This is surprising, especially in view of the high performance capability of the machine.

This article describes a utility program that provides some of the features of the Mouse. The program is called 'SHREW'.

The whole program is written in machine code, and is interrupt driven, so that once operational, the shrew is entirely transparent to normal system activities. For example, a Basic program will still run completely normally. The cursor symbol is provided by using a Sprite, sprite 0, since this has the highest priority of the sprites, and we do not want it to be obscured.

Note that the terms 'cursor' and 'shrew' are used interchangeably when referring to functions performed by this program.

To use the program, simply load in and run the supplied Basic loader. This will place the machine code program into memory, for use when required.

To activate the shrew, type in the following instruction:

SYS 49152,A,B,C,D

Note that the four numeric parameters after the address must be included (failure to do so results in a syntax error message). They provide information about the desired operation of the shrew.

The four parameters have the following effects:

A: Selects the image used for the shrew. In this program, two sample patterns are provided: 0 = 'Hand': 1 = 'Arrow'.

Any other value is illegal, and will not be accepted.

B: Selects the colour of the shrew. Any of the standard CBM 64 colours may be used, with their normal 'POKE' values:

0 = Black: 1 = White: and so on to 15 = Light Grey. Any illegal colour (i.e. outside the range 0-15) will not be accepted.

C: Controls the relationship between screen data and the shrew:

0 = Cursor is in front of text: 1 = Cursor is behind the text. Any illegal number will not be accepted.

D: Selects the device which will 'drive' the shrew. 0 = Keyboard (see below): 1 = Joystick (see below). Any illegal number will not be accepted.

When this instruction has been performed, a shrew symbol will appear in the top left hand corner of the screen. (The exact symbol depends on the value in parameter A.) The computer will immediately reply with a 'READY.' message, and will seem to be unaffected by the process. For example, Basic programs will run perfectly normally. However, if use is made of the driving device (as selected in parameter D), the shrew will move around the screen, as the User wishes. Information from the shrew can be obtained using the USR function (see below).

The keyboard may be selected as the device driving the shrew by giving parameter D the value 0. Henceforth, the following keys affect the shrew:

F1 Move the shrew up (if possible).
F3 Move the shrew right (if possible).
F5 Move the shrew left (if possible).
F7 Move the shrew down (if possible).
CBM The Commodore Logo key stores the *current* position of the shrew on the screen (see Shrew Information).

The joystick may be selected as the device driving the shrew by giving parameter D the value 1. Note that the joystick must be plugged into Control Port 2. By using the joystick in the fashion described, the following effects are obtained:

UP	Move shrew up (if possible).
RIGHT	Move shrew right (if possible).
LEFT	Move shrew left (if possible).
DOWN	Move shrew down (if possible).
FIRE	Stores the *current* position of the shrew on the screen (see Shrew Information).

Control of the shrew from within a program is (by definition!) limited. The shrew should control the program, not the other way round! Any accesses to information are performed by the USR function, with the actual operation being selected by the argument supplied.

Position

USR(0) This "switches off" the shrew. It disappears from the screen, and will no longer be moved by the driving device. In addition, the interrupt vector is restored to its original value. To reactivate the shrew, use the SYS 49152. . . command as before.

Note that (particularly when using the Disk Drive) it is advisable to disable the shrew during the loading or saving of programs or data (since interrupt timing is crucial).

USR(1) Returns the horizontal bit position of the shrew (in the range 0-319, with 0 = left of screen) when the fire button (or CBM logo key if using keyboard) was last pressed. This gives very accurate positioning of the shrew.

USR(2) Returns the vertical bit position of the shrew (in the range 0-199, with 0 = top of screen) when the fire button (or CBM logo if using keyboard) was last pressed. Again, this gives very accurate

```
1000 REM BASIC LOADER FOR SHREW PROGRAM.
1010 :
1020 REM BY A.WARMAN
1030 :
1040 ADDRESS=49152
1050 SUM=0
1060 :
1070 FOR LOC=ADDRESS TO ADDRESS+695
1080   READ DATUM
1090   POKE LOC,DATUM
1100   SUM=SUM+DATUM
1110 NEXT LOC
1120 :
1130 IF SUM<>70588 THEN PRINT "SUM ERROR."
1140 :
1150 STOP
1160 :
1170 DATA  32,135,193,192,  2,144,  3, 76, 72,178,192,  1,240,  6,169, 58
1180 DATA 162,194,208,  4,169,121,162,194,133,251,134,252,160, 62,177,251
1190 DATA 153,192,  2,136, 16,248, 32,135,193,192, 16,176,218,140, 39,208
1200 DATA  32,135,193,192,  2,176,208,132,  2,173, 27,208, 41,254,  5,  2
1210 DATA 141, 27,208, 32,135,193,192,  2,176,189,140, 53,194,169, 11,141
1220 DATA 248,  7,173, 21,208,  9,  1,141, 21,208,173, 23,208, 41,254,141
1230 DATA  23,208,173, 29,208, 41,254,141, 29,208,169, 24,162,  0,160, 50
1240 DATA  32,186,193, 32,160,193,120,173, 20,  3,201,167,208,  7,173, 21
1250 DATA   3,201,192,240, 22,173, 20,  3,141, 35,193,169,167,141, 20,  3
1260 DATA 173, 21,  3,141, 36,193,169,192,141, 21,  3, 88,169, 37,141, 17
1270 DATA   3,169,193,141, 18,  3, 96,  8,120, 72,138, 72,152, 72,172, 53
1280 DATA 194,208, 59,165,197,201, 64,208, 13,173,141,  2,201,  2,208,  3
1290 DATA  32,160,193, 76, 28,193,201,  4,208,  6, 32,207,193, 76, 28,193
1300 DATA 201,  5,208,  6, 32,233,193, 76, 28,193,201,  6,208,  6, 32,  2
1310 DATA 194, 76, 28,193,201,  3,208, 52, 32,220,193, 76, 28,193,173,  0
1320 DATA 220,141, 57,194, 32,152,193,176,  3, 32,207,193, 32,152,193,176
1330 DATA   3, 32,220,193, 32,152,193,176,  3, 32,  2,194, 32,152,193,176
1340 DATA   3, 32,233,193, 32,152,193,176,  3, 32,160,193,104,168,104,170
1350 DATA 104, 40, 76, 49,234, 32,141,193,152, 72, 41,  4,240,  3, 32,160
1360 DATA 193,104, 41,251,168,192,  0,208, 27,120,173, 35,193,141, 20,  3
1370 DATA 173, 36,193,141, 21,  3,173, 21,208, 41,254,141, 21,208,160,  0
1380 DATA 152, 88,240, 48,192,  1,208,  8, 32, 27,194,168,138, 76,132,193
1390 DATA 192,  2,208,  7, 32, 43,194,169,  0,240,  2,169,  2, 76
1400 DATA  72,178, 32, 43,194,152, 74, 74, 74,168, 32, 27,194, 72,138, 74
1410 DATA 104,106, 74, 74,108,  5,  0, 32,253,174, 32,138,173, 32,170,177
1420 DATA 201,  0,240,  3, 76, 72,178, 96,173, 57,194, 73,141, 57,194, 96
1430 DATA  32,173,193,141, 54,194,142, 55,194,140, 56,194, 96,173, 16,208
1440 DATA  41,  1,170,173,  0,208,172,  1,208, 96,141,  0,208,140,  1,208
1450 DATA  72,134,  2,173, 16,208, 41,254,  5,  2,141, 16,208,104, 96, 32
1460 DATA 173,193,136,192, 50,176,  2,160, 50, 76,186,193, 32,173,193,200
1470 DATA 192,250,144,  2,160,249, 76,186,193, 32,173,193, 24,105,  1, 72
1480 DATA 138,105,  0,170,104,224,  0,240,  6,201, 88,144,  2,169, 87, 76
1490 DATA 186,193, 32,173,193, 56,233,  1, 72,138,233,  0,170,104,224,  1
1500 DATA 240,  6,201, 24,176,  2,169, 24, 76,186,193,173, 54,194,174, 55
1510 DATA 194, 56,233, 24, 72,138,233,  0,170,104, 96, 72,173, 56,194, 56
1520 DATA 233, 50,168,104, 96,  0,  0,  0,  0,  0,224,  0,  0,240,  0,  0
1530 DATA 120,  0,  0, 60,  0,  0, 30,  0,  0, 15,  0,  0,  7,128,  0, 51
1540 DATA 192,  0,121,224,  0, 52,  0,  0,215,240,  0,227,240,  0,113, 56
1550 DATA   0, 58, 56,  0,  3,220,  0, 14,238,  0,  7,112,  0,  1,176,  0
1560 DATA   0,192,  0,  0, 64,  0,  0, 96,  0,254,  0,  0,240,  0,  0,248
1570 DATA   0,  0,220,  0,  0,206,  0,  0,  7,  0,  0,  3,128,  0,  1,  0
1580 DATA   0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0
1590 DATA   0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0
1600 DATA   0,  0,  0,  0,  0,  0,  0,  0
```

```
1000 C000                *=$C000
1010 C000                ;
1020 C000                ; SHREW PROGRAM (MOUSE SIMULATOR)
1030 C000                ; BY A.WARMAN.
1040 C000                ;
1050 C000                ;
1060 C000                ; PARAMETERS FOLLOWING CALL ARE AS FOLLOWS:
1070 C000                ;
1080 C000                ; SHREW NUMBER    (0 OR 1)
1090 C000                ;
1100 C000                ; SHREW COLOUR    (0 TO 15)
1110 C000                ;
1120 C000                ; SHREW PRIORITY (0=FRONT, 1=BACK)
1130 C000                ;
1140 C000                ; DEVICE SELECT:
1150 C000                ;
1160 C000                ;  0 = KEYBOARD
1170 C000                ;  1 = JOYSTICK
1180 C000                ;
1190 C000                ;
1200 C000                BADVALUE    =  $B248
1210 C000                TEMP        =  $02
1220 C000                ;
1230 C000                ;-----------------------------------
1240 C000                ;
1250 C000                ; FIND SHREW NUMBER.
1260 C000                ;
1270 C000 20B7C1 START   START       JSR GETVAL
1280 C003 C002           CPY #$02
1290 C005 9003           BCC VALIDSHREW
1300 C007 4C48B2 BADVAL  BADVAL      JMP BADVALUE
1310 C00A                ;
1320 C00A                ; IDENTIFY SHREW DATA.
1330 C00A                ;
1340 C00A C001   VALIDSHREW  CPY #$01
1350 C00C F006           BEQ USESHREW2
1360 C00E A93A           LDA #<SHREW1
1370 C010 A2C2           LDX #>SHREW1
1380 C012 D004           BNE MOVESHREW
1390 C014 A979   USESHREW2   LDA #<SHREW2
1400 C016 A2C2           LDX #>SHREW2
1410 C018                ;
1420 C018                ; COPY SHREW DATA TO SPRITE AREA.
1430 C018                ;
1440 C018 85FB   MOVESHREW   STA $FB
1450 C01A 86FC           STX $FC
1460 C01C A03E           LDY #$3E
1470 C01E B1FB   MOVELOOP    LDA ($FB),Y
1480 C020 99C002             STA $02C0,Y
1490 C023 88             DEY
1500 C024 10FB           BPL MOVELOOP
1510 C026                ;
1520 C026                ; FIND SHREW COLOUR.
1530 C026                ;
1540 C026 20B7C1             JSR GETVAL
1550 C029 C010               CPY #$10
1560 C02B B0DA               BCS BADVAL
1570 C02D 8C27D0             STY $D027
1580 C030                ;
1590 C030                ; FIND SHREW PRIORITY.
1600 C030                ;
1610 C030 20B7C1             JSR GETVAL
1620 C033 C002               CPY #$02
1630 C035 B0D0               BCS BADVAL
1640 C037 8402               STY TEMP
1650 C039 AD1BD0             LDA $D01B
1660 C03C 29FE               AND #%11111110
1670 C03E 0502               ORA TEMP
1680 C040 8D1BD0             STA $D01B
1690 C043                ;
1700 C043                ; FIND DRIVING DEVICE.
1710 C043                ;
1720 C043 20B7C1             JSR GETVAL
1730 C046 C002               CPY #$02
1740 C048 B0BD               BCS BADVAL
1750 C04A 8C35C2             STY DEVICE
1760 C04D                ;
1770 C04D                ; VECTOR SPRITE 0 TO SHREW AREA.
1780 C04D                ;
1790 C04D A90B               LDA #$0B
1800 C04F 8DFB07             STA $07FB
1810 C052                ;
1820 C052                ; ACTIVATE SPRITE 0.
1830 C052                ;
1840 C052 AD15D0             LDA $D015
1850 C055 0901               ORA %00000001
1860 C057 8D15D0             STA $D015
1870 C05A                ;
1880 C05A                ; MAKE SPRITE MINIMUM SIZE.
1890 C05A                ;
1900 C05A AD17D0             LDA $D017
1910 C05D 29FE               AND #%11111110
1920 C05F 8D17D0             STA $D017
1930 C062 AD1DD0             LDA $D01D
1940 C065 29FE               AND #%11111110
1950 C067 8D1DD0             STA $D01D
1960 C06A                ;
1970 C06A                ; SET START POSITION OF SHREW ON SCREEN.
1980 C06A                ;
1990 C06A A918               LDA #$18
2000 C06C A200               LDX #$00
2010 C06E A032               LDY #$32
2020 C070 20BAC1             JSR PUTSHREW
2030 C073 20A0C1             JSR SAVSHREW
2040 C076                ;
2050 C076                ; FIND IF IRQ VECTOR IS ALREADY
2060 C076                ; CORRECT.
2070 C076                ;
2080 C076 78                 SEI
2090 C077 AD1403             LDA $0314
2100 C07A C9A7               CMP #<IRQSCAN
2110 C07C D007               BNE MODIFY
2120 C07E AD1503             LDA $0315
2130 C081 C9C0               CMP #>IRQSCAN
2140 C083 F016               BEQ NOIRQMOD
2150 C085                ;
2160 C085                ; THE IRQ VECTOR MUST BE ALTERED.
2170 C085                ;
2180 C085 AD1403 MODIFY      LDA $0314
2190 C088 8D23C1             STA EXIT+1
2200 C08B A9A7               LDA #<IRQSCAN
2210 C08D 8D1403             STA $0314
2220 C090 AD1503             LDA $0315
2230 C093 8D24C1             STA EXIT+2
2240 C096 A9C0               LDA #>IRQSCAN
2250 C098 8D1503             STA $0315
2260 C09B                ;
2270 C09B                ; MODIFY USR VECTOR FOR SHREW
2280 C09B                ; DATA ACCESS.
2290 C09B                ;
2300 C09B 58     NOIRQMOD    CLI
2310 C09C A925               LDA #<SHREWINFO
2320 C09E 8D1103             STA $0311
2330 C0A1 A9C1               LDA #>SHREWINFO
2340 C0A3 8D1203             STA $0312
2350 C0A6 60                 RTS
2360 C0A7                ;
2370 C0A7                ;-----------------------------------
2380 C0A7                ;
2390 C0A7                ; EVERY INTERRUPT, SERVICE SHREW.
2400 C0A7                ;
2410 C0A7 08     IRQSCAN     PHP
2420 C0A8 78                 SEI
2430 C0A9 48                 PHA
2440 C0AA 8A                 TXA
2450 C0AB 48                 PHA
2460 C0AC 98                 TYA
2470 C0AD 48                 PHA
2480 C0AE                ;
2490 C0AE                ; WHAT IS THE DRIVING DEVICE?
2500 C0AE                ;
2510 C0AE AC35C2             LDY DEVICE
2520 C0B1 D03B               BNE JOYSERV
2530 C0B3                ;
2540 C0B3                ; GET KEYBOARD DATA.
2550 C0B3                ;
2560 C0B3 A5C5               LDA $C5
2570 C0B5 C940               CMP #$40
2580 C0B7 D00D               BNE CHECKEY
2590 C0B9                ;
2600 C0B9                ; IS IT A KEYBOARD 'FIRE'?
2610 C0B9                ;
2620 C0B9 AD8D02             LDA $02BD
2630 C0BC C902               CMP #$02
2640 C0BE D003               BNE NOFIRE
2650 C0C0 20A0C1             JSR SAVSHREW
2660 C0C3 4C1CC1 NOFIRE      JMP IRQSERV
2670 C0C6                ;
2680 C0C6                ; CHECK FOR F-KEYS.
2690 C0C6                ;
2700 C0C6 C904   CHECKEY     CMP #$04
2710 C0C8 D006               BNE NOTUP
2720 C0CA 20CFC1             JSR UP
2730 C0CD 4C1CC1             JMP IRQSERV
2740 C0D0 C905   NOTUP       CMP #$05
2750 C0D2 D006               BNE NOTRIGHT
2760 C0D4 20E9C1             JSR RIGHT
2770 C0D7 4C1CC1             JMP IRQSERV
2780 C0DA C906   NOTRIGHT    CMP #$06
2790 C0DC D006               BNE NOTLEFT
2800 C0DE 2002C2             JSR LEFT
2810 C0E1 4C1CC1             JMP IRQSERV
2820 C0E4 C903   NOTLEFT     CMP #$03
2830 C0E6 D034               BNE IRQSERV
2840 C0E8 20DCC1             JSR DOWN
2850 C0EB 4C1CC1             JMP IRQSERV
2860 C0EE                ;
2870 C0EE                ; GET STATUS OF JOYSTICK.
2880 C0EE                ;
2890 C0EE AD00DC JOYSERV     LDA $DC00
2900 C0F1 8D39C2             STA JOYKEEP
2910 C0F4 2098C1             JSR TESTJOY
2920 C0F7 B003               BCS NOTJUP
2930 C0F9 20CFC1             JSR UP
2940 C0FC 2098C1 NOTJUP      JSR TESTJOY
2950 C0FF B003               BCS NOTJDOWN
2960 C101 20DCC1             JSR DOWN
2970 C104 2098C1 NOTJDOWN    JSR TESTJOY
2980 C107 B003               BCS NOTJLEFT
2990 C109 2002C2             JSR LEFT
3000 C10C 2098C1 NOTJLEFT    JSR TESTJOY
3010 C10F B003               BCS NOTJRIGHT
3020 C111 20E9C1             JSR RIGHT
3030 C114 2098C1 NOTJRIGHT   JSR TESTJOY
3040 C117 B003               BCS IRQSERV
3050 C119 20A0C1             JSR SAVSHREW
3060 C11C                ;
3070 C11C                ; SHREW SERVICING COMPLETE.
3080 C11C                ;
3090 C11C 68     IRQSERV     PLA
3100 C11D A8                 TAY
3110 C11E 68                 PLA
3120 C11F AA                 TAX
3130 C120 68                 PLA
3140 C121 28                 PLP
3150 C122 4C31EA EXIT        JMP $EA31
3160 C125                ;
3170 C125                ;
3180 C125                ;-----------------------------------
3190 C125                ;
3200 C125                ; PERFORM SHREW COMMAND.
3210 C125                ;
3220 C125 20BDC1 SHREWINFO   JSR GETFP1
3230 C128 98                 TYA
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3240 C129 48                    PHA
3250 C12A 2904                  AND #%00000100
3260 C12C F003                  BEQ NOTCURRENT
3270 C12E 20A0C1                JSR SAVSHREW
3280 C131 68        NOTCURRENT  PLA
3290 C132 29FB                  AND #%11111011
3300 C134 A8                    TAY
3310 C135 C000                  CPY #$00
3320 C137 D01B                  BNE NOTOFF
3330 C139           ;
3340 C139           ; DISABLE SHREW.
3350 C139           ;
3360 C139 78                    SEI
3370 C13A AD23C1                LDA EXIT+1
3380 C13D 8D1403                STA $0314
3390 C140 AD24C1                LDA EXIT+2
3400 C143 8D1503                STA $0315
3410 C146 AD15D0                LDA $D015
3420 C149 29FE                  AND #%11111110
3430 C14B 8D15D0                STA $D015
3440 C14E A000                  LDY #$00
3450 C150 98                    TYA
3460 C151 58                    CLI
3470 C152 F030                  BEQ INFOEXIT
3480 C154           ;
3490 C154 C001      NOTOFF      CPY #$01
3500 C156 D008                  BNE NOTBITX
3510 C158           ;
3520 C158           ; RETURN X-BIT POSITION.
3530 C158           ;
3540 C158 201BC2                JSR GETXBIT
3550 C15B AB                    TAY
3560 C15C 8A                    TXA
3570 C15D 4CB4C1                JMP INFOEXIT
3580 C160           ;
3590 C160 C002      NOTBITX     CPY #$02
3600 C162 D007                  BNE NOTBITY
3610 C164           ;
3620 C164           ; RETURN Y-BIT POSITION.
3630 C164           ;
3640 C164 202BC2                JSR GETYBIT
3650 C167 A900                  LDA #$00
3660 C169 F019                  BEQ INFOEXIT
3670 C16B           ;
3680 C16B C003      NOTBITY     CPY #$03
3690 C16D F003                  BEQ ISCHAR
3700 C16F 4C48B2                JMP BADVALUE
3710 C172           ;
3720 C172           ; RETURN CHARACTER POSITION.
3730 C172           ;
3740 C172 202BC2    ISCHAR      JSR GETYBIT
3750 C175 98                    TYA
3760 C176 4A                    LSR A
3770 C177 4A                    LSR A
3780 C178 4A                    LSR A
3790 C179 AB                    TAY
3800 C17A 201BC2                JSR GETXBIT
3810 C17D 48                    PHA
3820 C17E 8A                    TXA
3830 C17F 4A                    LSR A
3840 C'80 68                    PLA
3850 C181 6A                    ROR A
3860 C182 4A                    LSR A
3870 C183 4A                    LSR A
3880 C184           ;
3890 C184 6C0500    INFOEXIT    JMP ($0005)
3900 C187           ;
3910 C187           ;-------------------------------------
3920 C187           ; GET NEXT DATUM.
3930 C187           ;
3940 C187 20FDAE    GETVAL      JSR $AEFD
3950 C18A 20BAAD                JSR $ADBA
3960 C18D 20AAB1    GETFP1      JSR $B1AA
3970 C190 C900                  CMP #$00
3980 C192 F003                  BEQ VALUEOK
3990 C194 4C48B2                JMP BADVALUE
4000 C197 60        VALUEOK     RTS
4010 C198           ;
4020 C198           ;-------------------------------------
4030 C198           ; TEST FOR NEXT JOYSTICK BIT.
4040 C198           ;
4050 C198 AD39C2    TESTJOY     LDA JOYKEEP
4060 C19B 4A                    LSR A
4070 C19C BD39C2                STA JOYKEEP
4080 C19F 60                    RTS
4090 C1A0           ;
4100 C1A0           ;-------------------------------------
4110 C1A0           ; FIND AND STORE CURRENT SHREW POSITION.
4120 C1A0           ;
4130 C1A0 20ADC1    SAVSHREW    JSR GETSHREW
4140 C1A3 8D36C2                STA SHREWX
4150 C1A6 8E37C2                STX SHREWX+1
4160 C1A9 8C38C2                STY SHREWY
4170 C1AC 60                    RTS
4180 C1AD           ;
4190 C1AD           ;-------------------------------------
4200 C1AD           ; FIND CURRENT SHREW POSITION.
4210 C1AD           ;
4220 C1AD AD10D0    GETSHREW    LDA $D010
4230 C1B0 2901                  AND #%00000001
4240 C1B2 AA                    TAX
4250 C1B3 AD00D0                LDA $D000
4260 C1B6 AC01D0                LDY $D001
4270 C1B9 60                    RTS
4280 C1BA           ;
4290 C1BA           ;-------------------------------------
4300 C1BA           ;
4310 C1BA           ; SET CURRENT SHREW POSITION.
4320 C1BA           ;
4330 C1BA 8D00D0    PUTSHREW    STA $D000
4340 C1BD 8C01D0                STY $D001
4350 C1C0 48                    PHA
4360 C1C1 8602                  STX TEMP
4370 C1C3 AD10D0                LDA $D010
4380 C1C6 29FE                  AND #%11111110
4390 C1C8 0502                  ORA TEMP
4400 C1CA 8D10D0                STA $D010
4410 C1CD 68                    PLA
4420 C1CE 60                    RTS
4430 C1CF           ;
4440 C1CF           ;-------------------------------------
4450 C1CF           ; MOVE SHREW UP ONE PIXEL.
4460 C1CF           ;
4470 C1CF 20ADC1    UP          JSR GETSHREW
4480 C1D2 88                    DEY
4490 C1D3 C032                  CPY #$32
4500 C1D5 B002                  BCS UPOK
4510 C1D7 A032                  LDY #$32
4520 C1D9 4CBAC1    UPOK        JMP PUTSHREW
4530 C1DC           ;
4540 C1DC           ;-------------------------------------
4550 C1DC           ; MOVE SHREW DOWN ONE PIXEL.
4560 C1DC           ;
4570 C1DC 20ADC1    DOWN        JSR GETSHREW
4580 C1DF C8                    INY
4590 C1E0 C0FA                  CPY #$FA
4600 C1E2 9002                  BCC DOWNOK
4610 C1E4 A0F9                  LDY #$F9
4620 C1E6 4CBAC1    DOWNOK      JMP PUTSHREW
4630 C1E9           ;
4640 C1E9           ;-------------------------------------
4650 C1E9           ; MOVE SHREW RIGHT ONE PIXEL.
4660 C1E9           ;
4670 C1E9 20ADC1    RIGHT       JSR GETSHREW
4680 C1EC 18                    CLC
4690 C1ED 6901                  ADC #$01
4700 C1EF 48                    PHA
4710 C1F0 8A                    TXA
4720 C1F1 6900                  ADC #$00
4730 C1F3 AA                    TAX
4740 C1F4 68                    PLA
4750 C1F5 E000                  CPX #$00
4760 C1F7 F006                  BEQ RIGHTOK
4770 C1F9 C958                  CMP #$58
4780 C1FB 9002                  BCC RIGHTOK
4790 C1FD A957                  LDA #$57
4800 C1FF 4CBAC1    RIGHTOK     JMP PUTSHREW
4810 C202           ;
4820 C202           ;-------------------------------------
4830 C202           ; MOVE SHREW LEFT ONE PIXEL.
4840 C202           ;
4850 C202 20ADC1    LEFT        JSR GETSHREW
4860 C205 38                    SEC
4870 C206 E901                  SBC #$01
4880 C208 48                    PHA
4890 C209 8A                    TXA
4900 C20A E900                  SBC #$00
4910 C20C AA                    TAX
4920 C20D 68                    PLA
4930 C20E E001                  CPX #$01
4940 C210 F006                  BEQ LEFTOK
4950 C212 C918                  CMP #$18
4960 C214 B002                  BCS LEFTOK
4970 C216 A918                  LDA #$18
4980 C218 4CBAC1    LEFTOK      JMP PUTSHREW
4990 C21B           ;
5000 C21B           ;-------------------------------------
5010 C21B           ;
5020 C21B           ; GET X-BIT POSITION.
5030 C21B           ;
5040 C21B AD36C2    GETXBIT     LDA SHREWX
5050 C21E AE37C2                LDX SHREWX+1
5060 C221 38                    SEC
5070 C222 E918                  SBC #$18
5080 C224 48                    PHA
5090 C225 8A                    TXA
5100 C226 E900                  SBC #$00
5110 C228 AA                    TAX
5120 C229 68                    PLA
5130 C22A 60                    RTS
5140 C22B           ;
5150 C22B           ;-------------------------------------
5160 C22B           ;
5170 C22B           ; GET Y-BIT POSITION.
5180 C22B           ;
5190 C22B 48        GETYBIT     PHA
5200 C22C AD38C2                LDA SHREWY
5210 C22F 38                    SEC
5220 C230 E932                  SBC #$32
5230 C232 AB                    TAY
5240 C233 68                    PLA
5250 C234 60                    RTS
5260 C235           ;
5270 C235           ;-------------------------------------
5280 C235           ;
5290 C235           ; SHREW/DEVICE INFORMATION STORE.
5300 C235           ;
5310 C235 00        DEVICE      BYT $00
5320 C236 0000      SHREWX      WOR $00
5330 C238 00        SHREWY      BYT $00
5340 C239 00        JOYKEEP     BYT $00
5350 C23A           ;
5360 C23A           ;-------------------------------------
5370 C23A           ;
5380 C23A E00000    SHREW1      BYT %11100000,%00000000,%00000000
5390 C23D F00000                BYT %11110000,%00000000,%00000000
5400 C240 7B0000                BYT %01111000,%00000000,%00000000
5410 C243 3C0000                BYT %00111100,%00000000,%00000000
5420 C246 1E0000                BYT %00011110,%00000000,%00000000
5430 C249 0F0000                BYT %00001111,%00000000,%00000000
5440 C24C 078000                BYT %00000111,%10000000,%00000000
5450 C24F 33C000                BYT %00110011,%11000000,%00000000
5460 C252 79E000                BYT %01111001,%11100000,%00000000
5470 C255 340000                BYT %00110100,%00000000,%00000000
```

positioning of the shrew.

USR(3) This is probably the most useful command. The result should be considered as a positive 16-bit number. The top byte is the horizontal character number (in the range 0-39, where 0 = left of screen), and the low byte is the vertical row number (in the range 0-24, where 0 = top of screen). For example:

ANSWER = USR(3)
COL = INT(ANSWER – 256)
ROW = ANSWER—X*256

leaves COL with the column, and ROW with the row. Note that, as before, the values reflect the position of the shrew when the fire button (or CBM logo key) was last pressed.

Note that the information returned gives the position of the top left hand corner of the schrew pattern.

In the above functions, the results obtained refer to the position of the shrew when the fire button (or CBM logo key) was last pressed, probably the most useful reading. However, there may be doccasions when an actual current position is required. If so, simply add the number 4 to the parameter of the USR function:

e.g. . . .USR(4 + 3)

The effect of this is to force the program to find the current position of the shrew, before performing the chosen task. In the above example, the value returned is the current X—Y character position of the shrew. Similarly, USR(4 + 1) — or USR(5), the same thing — returns the current X-bit position.

Now on to the program description. Please refer to the Assembly listing when following the description of how the program works. A general overview of the program is as follows:

Overview

1270-2350 Initialise and enable Shrew.
2410-3150 Shrew service program, called every time an interrupt occurs.
3220-3890 Handle USR requests, return data or disable shrew.
3940-5250 Program subroutines.
5310-5340 Program variable storage.
5380-5820 Data giving the sprite patterns for the shrew

A detailed look at the program reveals that its construction is in fact relatively simple, and could be modified to suit a user's personal requirements. In addition, the program demonstrates how easy it is to add "transparent" functions that are interrupt driven. Have you ever wondered how music can occur at the same time as the visual action in all those games? Exactly the same principles are used as demonstrated here!

1270-1300: Find the value of parameter A. The answer is left in the Y register. A check is made to ensure that the value is legal. If not, a jump is made into the Basic ROMs to give an error message.

1340-1400: Having found a valid shrew number, find where the data which makes up the sprite pattern for that shrew is stored. The start address is put into A and X for easy use.

1440-1500: Using the start address of the data, the sprite pattern is copied into an unused area of RAM. The Commodore *Programmers Reference Guide* identifies memory locations $02A7 to $02FF as unused, which is perfect for the job.

1540-1570: Find the value of parameter B. As before (lines 1270-1300), the evaluation is made and the result returned in the Y register. The value must be in the range 0 to 15 inclusive (the legal colour numbers). Once a legal colour is obtained, it is placed into the colour register for sprite 0.

1610-1680: Find the value for parameter C. This selects whether the shrew is to appear in front (value = 0) or behind (value = 1) any text on the screen. The shrew will always appear in front of other sprites, since sprite 0 (the one chosen to act as the shrew) has the highest sprite priority.

1720-1750: Find the value of parameter D. This selects which device is used to 'drive' the shrew; whether keyboard (value = 0) or joystick (value = 1). Note that if the joystick is chosen, it must be plugged into Control Port 2.

At this point, all parameters following the SYS command have been evaluated and used (assuming that they had legal values!). The next stage is to initialise the shrew and its driving programs.

1790-1800: Store the page address of the shrew pattern data in the sprite 0 address register. Note that the data is stored from location $02C0, which is sprite page number $0B — for definition of what a "sprite page" is, please refer to the Programmers Reference Guide.

1840-1860: Enable the sprite so that it can appear on the screen.

1900-1950: When first appearing, the shrew sprite will be set to minimum size — i.e. no X or Y expansion — since this looks better. However, if the User wishes, the shrew can be expanded in either direction once initialised without interference from the program.

1990-2030: The initial position of the shrew on the screen is set to the top left hand corner. The A and X registers combine to form a 9-bit address in the 'X' direction across the screen from left to right; while the Y register gives the 8-bit address in the 'Y' direction down the screen from top to bottom. Sprites are permitted to move off the edges of the screen, but this is no use for a shrew, so the initial values are set so that the shrew will appear exactly in the top left hand corner of the 40x25 screen.

Interrupt

Two subroutines are called, the first translates the coordinates in the three registers into the actual sprite position; and the second stores the position as if fire (or the CBM logo key) had just been used.

The entire program for driving the sprite is interrupt driven, so that it requires no direction from the user or programmer. In view of the fact that the shrew may be enabled – disabled several times during a session, it's important that the modification of the various interrupt vectors is handled in a methodical fashion. First of all, a check is made to see if the interrupt is already driving the shrew. If not, the vector is altered to jump to the shrew driver before the usual interrupt routine. Furthermore, it is possible that the interrupt vector has been altered previously, so that there is no guarantee that when the driver has finished its work, it should then jump straight into the ROM routines for handling interrupts. Accordingly, the *old* vector is stored and used when the driver has finished. When the shrew program is disabled (by the USR(0) function), this old vector isput *back* into the vector location.

2080-2140: Disable the interrupts while "tampering" with the vector. Check to see if any modification to the interrupt vector is required.

Vector

2180-2250: The interrupt vector must be made to point to the shrew driver program. The original vector is placed at the end of the driver, so that when the driver routine has finished, the interrupt can be allowed to continue in the usual fashion.

2300-2350: The alteration of the interrupt vector is now complete (if it was necessary!), so re-enable the system interrupts. Finally, alter the USR vector so that the interaction between user and shrew information can be achieved easily.

This next section of the utility is the actual shrew driver that is called by the interrupt vector.

2410-2470: Preserve all registers on entry to the interrupt routine. This is vital, because it is not possible to tell what information is contained in them, so it must be assumed that the values are important. Accordingly, they are stored on the stack for easy retrieval at the end of the routine.

2510-2520: Find which device is driving the shrew, and jump accordingly.

The Keyboard has been selected as the driving device.

2560-2580: The current value of the keyboard matrix is loaded into the A register. Although the codes are unique to each key, these codes are not ASCII codes. If the value found is $40, then no key is currently being pressed.

2620-2660: No normal key is being pressed, so check to see if the CBM logo key is being held down. If it is, find and store the current shrew position. Jump to the end of the driver routine.

2700-2850: One of the normal keys was being pressed, so this routine checks to see if it was one of the function keys, and if so, acts accordingly; thus pressing the F1 key satisfies the test in lines 2700-2720, so that the shrew is moved up (if possible). Jump to the end of the driver routine.

The Joystick was chosen as the driving device. The advantage of using the joystick is that the bits can be tested in a logical fashion.

2890-3050: The current status of the joystick is obtained, and preserved for testing. Each bit is tested in turn by calling a subroutine which returns with the carry bit indicating the status of the least significant bit. When taken in order, these bits show the current position of the joystick, and whether the fire button is being pressed. Note that because several events can happen at the same time, e.g.

```
5480 C25B D7F000          BYT %11010111,%11110000,%00000000
5490 C25B E3F000          BYT %11100011,%11110000,%00000000
5500 C25E 713B00          BYT %01110001,%00111000,%00000000
5510 C261 3A3B00          BYT %00111010,%00111000,%00000000
5520 C264 03DC00          BYT %00000011,%11011100,%00000000
5530 C267 0EEE00          BYT %00001110,%11101110,%00000000
5540 C26A 077000          BYT %00000111,%01110000,%00000000
5550 C26D 01B000          BYT %00000001,%10110000,%00000000
5560 C270 00C000          BYT %00000000,%11000000,%00000000
5570 C273 004000          BYT %00000000,%01000000,%00000000
5580 C276 004000          BYT %00000000,%01000000,%00000000
5590 C279                 ;
5600 C279                 ;-----------------------------------
5610 C279                 ;
5620 C279 FE0000 SHREW2   BYT %11111110,%00000000,%00000000
5630 C27C F00000          BYT %11110000,%00000000,%00000000
5640 C27F F80000          BYT %11111000,%00000000,%00000000
5650 C282 DC0000          BYT %11011100,%00000000,%00000000
5660 C285 CE0000          BYT %11001110,%00000000,%00000000
5670 C288 070000          BYT %00000111,%00000000,%00000000
5680 C28B 038000          BYT %00000011,%10000000,%00000000
5690 C28E 010000          BYT %00000001,%00000000,%00000000
5700 C291 000000          BYT %00000000,%00000000,%00000000
5710 C294 000000          BYT %00000000,%00000000,%00000000
5720 C297 000000          BYT %00000000,%00000000,%00000000
5730 C29A 000000          BYT %00000000,%00000000,%00000000
5740 C29D 000000          BYT %00000000,%00000000,%00000000
5750 C2A0 000000          BYT %00000000,%00000000,%00000000
5760 C2A3 000000          BYT %00000000,%00000000,%00000000
5770 C2A6 000000          BYT %00000000,%00000000,%00000000
5780 C2A9 000000          BYT %00000000,%00000000,%00000000
5790 C2AC 000000          BYT %00000000,%00000000,%00000000
5800 C2AF 000000          BYT %00000000,%00000000,%00000000
5810 C2B2 000000          BYT %00000000,%00000000,%00000000
5820 C2B5 000000          BYT %00000000,%00000000,%00000000
```

UP and RIGHT (resulting in a movement to top right), and FIRE (resulting in the storage of the current position); it follows that the joystick gives greater control over the shrew than that provided by the keyboard.

3090-3150: The driving of the shrew is completed for this interrupt, so retrieve the register values stored on the stack, and jump to the old interrupt address. Note that although in the listing the address given causes a jump into the ROMs, in practice the address may well have been altered during initialisation (lines 2180-2250).

This next section performs the tasks selected by the USR function.

3220-3320: Get the parameter supplied with the USR function. Test to see if the value is 4 or more. If so, find the current shrew position, then subtract 4 from the value of the parameter. Is the actual command parameter zero? (value 0 means disable the shrew).

3360-3470: Disable the shrew. Restore the interrupt vector to its original value. Switch off sprite 0. Return with the value 0.

3490-3570: Check to see if the X-bit position is required. If so, obtain the data.

3590-3660: Check to see if the Y-bit position is required. If so, obtain the data.

3680-3870: Check to see if the character position is required. If not, then an illegal parameter was given, so produce an error. When returning the character position, the bit-positions are used, and then divided by 8 (since 8 bits = 1 character). This division is easily achieved using bit shifts.

3890: The value to be returned is now in the A and Y registers. This instruction performs an indirect jump that will return the value to Basic, as required by the USR function.

The next lines are the subroutines used by the program.

3940-3950: Used when retrieving the parameters passed by the SYS command. First a check is made to ensure that a comma character is present (line 3940). Then, the expression following the comma is evaluated and the result left in a "Floating Point Accumulator" — some system locations in zero page RAM.

3960-4000: These lines take the current value in the Floating Point Accumulator, and convert it into a 16-bit integer in the A and Y registers. The USR function automatically places its argument into the F-P Accumulator, so this routine retrieves it. At no time does this utility program expect any value above 15, so a check is made at this point to see if the number is larger than 255 (i.e. the high byte is checked). If the value *is* greater than 255 (i.e. the high byte is not zero), then an eror is forced.

4050-4080: If the device driving the shrew is the joystick, then each bit must be tested in turn. This routine returns with the carry flag reflecting the value of the LSB (thus, if the LSB is 1, the carry flag is set). At the same time, as each bit is tested, it is discarded by shifting, so that the next bit can be tested later.

4130-4170: This routine finds and preserves the current position of the shrew. Having got the current position, it is stored in memory.

4220-4270: This routine finds the current position of the shrew (sprite), by reading the values in the sprite registers of the VIC-II chip. The answers are returned in the A,X and Y registers.

4330-4420: This routine moves the shrew to the location specified by the contents of the A, X and Y registers.

4470-4520: Moves the shrew up by one pixel, as long as it is not already at the top of the screen.

4570-4620: Moves the shrew down by one pixel, as long as it is not already at the bottom of the screen.

4670-4800: Moves the shrew right by one pixel.

4850-4980: Moves the shrew left by one pixel.

5040-5130: Returns with the current X-bit (horizontal) position of the shrew. The value is corrected for the displacement necessary to prevent the sprite disappearing off the left of the screen.

5190-5250: Returns with the current Y-bit (vertical) position of the shrew. The value is corrected for the displacement necessary to prevent the sprite disappearing off the top of the screen.

The remaining sections are for data storage.

5310-5340: Storage for the number identifying the driving device; for the current position of the shrew when 'fire' (or the CBM logo key) was last pressed; and the data for testing joystick bits.

5380-5820: These locations contain the bit patterns for the sprite that forms the shrew pattern.

Shrew 1 is a pointing hand, Shrew 2 is an arrow.■

```
C007 BADVAL      B248 BADVALUE    C0C6 CHECKEY     C235 DEVICE
C1DC DOWN        C1E6 DOWNOK      C122 EXIT        C18D GETFP1
C1AD GETSHREW    C187 GETVAL      C21B GETXBIT     C22B GETYBIT
C184 INFOEXIT    C0A7 IRQSCAN     C11C IRQSERV     C172 ISCHAR
C239 JOYKEEP     C0EE JOYSERV     C202 LEFT        C218 LEFTOK
C085 MODIFY      C01E MOVELOOP    C018 MOVESHREW   C0C3 NOFIRE
C09B NOIRQMOD    C160 NOTBITX     C16B NOTBITY     C131 NOTCURRENT
C104 NOTJDOWN    C10C NOTJLEFT    C114 NOTJRIGHT   C0FC NOTJUP
C0E4 NOTLEFT     C154 NOTOFF      C0DA NOTRIGHT    C0D0 NOTUP
C1BA PUTSHREW    C1E9 RIGHT       C1FF RIGHTOK     C1A0 SAVSHREW
C23A SHREW1      C279 SHREW2      C125 SHREWINFO   C236 SHREWX
C238 SHREWY      C000 START       0002 TEMP        C198 TESTJOY
C1CF UP          C1D9 UPOK        C014 USESHREW2   C00A VALIDSHREW
C197 VALUEOK
```

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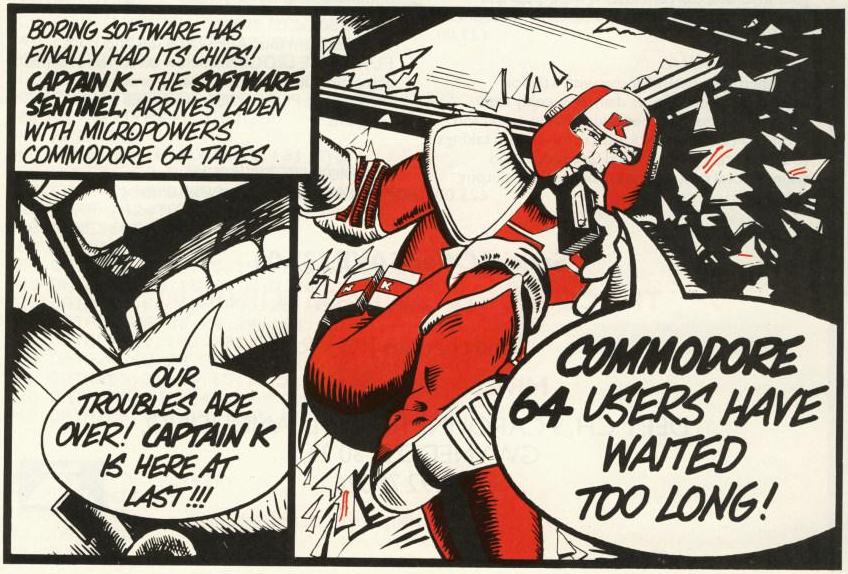
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Feenix

This game for the unexpanded Vic 20 comes from Abtar Bangar from Bilston

FEENIX ATTACK is a fast arcade game written in two parts. Part One gives the instructions and defines the graphics, then auto loads and runs Part Two. The machine code routine in Part Two could not be put into Part One because it is stored in the cassette buffer, and is cancelled when the cassette is used.

Full play instructions are given in the program.

Type in and SAVE Part One, then type and SAVE Part Two, rewind and LOAD.

```
50 REM****PART 1*****
60 PRINT"■■":POKE36879,8
80 GOTO580
100 POKE646,INT(RND(1)*7)+1
120 PRINT"■■■■A L I E N  A T T A C K"
140 PRINT"        ■H ■ABSOFT"
160 POKE646,INT(RND(1)*7)+1
180 PRINT" ■■USING YOUR LASER■ F@G"
200 PRINT"■■DESTROY AS MANY ALIENS"
220 POKE646,INT(RND(1)*7)+1
240 PRINT"   B    C    D    E"
260 PRINT"■■■    AS POSSIBLE IN"
280 POKE646,INT(RND(1)*7)+1
300 PRINT"■■     TWO MINUTES."
320 GETA$:IFA$=""THEN100
340 PRINT"■":POKE36869,240
360 POKE646,INT(RND(1)*7)+1
380 PRINT"■   YOU SCORE 10 FOR      ■     A HIT,"
400 PRINT"■    YOU LOSE 5 FOR      ■     A MISS"
420 PRINT"■■EACH ALIEN YOU DESTROY";
440 PRINT"■IS REPLACED BY ANOTHER"
460 PRINT" BY THE WAY THE FIRE"
480 PRINT"■    BUTTON IS ■B■"
500 PRINT"■■PRESS ANY KEY TO LOAD"
520 GETA$:IFA$=""THEN360
540 PRINT"■"
560 POKE198,10:POKE631,131:END
580 POKE56,28:POKE52,28:RESTORE
600 FORP=7168TO7239:READA:POKEP,A:NEXT
620 FORP=7424TO7431:POKEP,0:NEXT
640 POKE36869,255
660 GOTO120
680 DATA153,231,165,153,153,90,24,24
700 DATA8,16,8,16,8,16,8,16
720 DATA129,66,126,90,126,126,231,189
740 DATA32,66,37,24,24,164,66,4
760 DATA24,60,102,231,255,36,66,36
780 DATA24,60,90,255,126,24,36,66
800 DATA255,31,15,15,19,32,32,32
820 DATA255,248,240,240,200,4,4,4
840 DATA126,129,153,161,161,153,129,126


5 REM****PART 2*****
10 CLR:GOSUB355
15 GOSUB445
20 GOSUB380
25 PRINT"■"
30 PRINT"■■      ■PLEASE WAIT"
```

Continued on page 50

```
35 GOSUB310
40 FORK=1TO10:FORP=250TO190STEP-K:POKES3+1,P
45 NEXT:POKES3+1,0:NEXT
50 TI$="000000"
55 POKEQ,0:POKE38411,5
60 POKEQ+1,7:POKE38412,5
65 POKEQ-1,6:POKE38410,5
70 SYS832
75 POKES1,199:POKES2,217:POKES3,220
80 FORK=1TO10:NEXT:POKES1,0:POKES2,0:POKES3,0:
85 PRINT"■■SC:"SC
90 PRINT"■■■■■■■■■■■■■■■■■■■■■TIME"RIGHT$(TI$,3)
95 IFSC>200THENA=25
100 IFSC>300THENA=10
105 IFSC>400THENA=1
110 FORK=0TOA:NEXT
115 A$="":GETA$
120 IFA$="B"THENGOSUB135
125 IFTI$>"000200"THEN160
130 GOTO70
135 D=252:FORF=WTOESTEP22:POKEF,1:POKEF-22,32:POKES2,D:POKES3,D:D=D-4
140 IFPEEK(F+22)<>32THEN475
145 NEXT:POKEE,32:SC=SC-5
150 IFSC<0THENSC=0
155 RETURN
160 PRINT"■■■■■■■■■■■■■■■■■■■■■TIME UP!"
165 POKES1,0:POKES2,0:POKES3,0:POKES4,0
170 FORK=1TO1200:NEXT
175 PRINT"■"
180 POKER1,34:POKER2,60:POKER3,128:POKER4,130
185 F=200:G=167
190 FORK=22TO0STEP-1:POKER1,12+K:POKER2,38+K:POKER3,150-K:POKER4,174-K*2
195 FORO=1TO85:NEXT
200 POKES1,F:POKES2,G:F=F+1:G=G+1
205 NEXT
210 PRINT"■■■■":POKE36869,240
215 PRINT"■ ▗▟▀▀▙▖                ▗
220 PRINT"  ▝▖
225 PRINT"    ▝▖  ▗▛▀▜▖▗▛▀▜▖"
230 PRINT"      ▝▖▐  ▐  ▐▙▄▟▘"
235 PRINT"       ▝▖▐  ▐  ▐▝▖ ▗▛▀"
240 PRINT" ▗▝▖▄▄▟▘ ▝▖▄▄▟▘▐ ▝▖▙▄▄▗"
245 PRINT"■■■"
250 PRINT"■       ┌──────────┐
255 PRINT"        │          │"
260 PRINT"        └──────────┘"
265 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■";SC
270 POKES1,0:POKES2,0:POKES4,0
275 FORK=15TO1STEP-.5:POKEV,K
280 FORL=255TO128STEP-6:POKES3,L:NEXTL,K:POKES3,0:POKEV,15
285 PRINT"■■■       AGAIN(Y/N)"
290 GETB$:IFB$=""THEN290
295 IFB$="Y"THENRUN
300 IFB$="N"THENPRINT"■■":POKE36879,27:POKE36869,240:END
305 GOTO290
310 FORK=7724TO8142:POKEK+30720,INT(RND(1)*6)+2:NEXT
315 FORT=1TO10
320 O=INT(RND(1)*396)
325 I=INT(RND(1)*4)+2
330 POKE7768+O,I:NEXT
335 PRINT"■■PRESS ANY KEY TO START";
340 GETA$:IFA$=""THEN340
345 PRINT"■■                          ";
```

Continued on page 53

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```
350 RETURN
355 PRINT"■":POKE36869,255:Q=7691:W=7735:E=8153:S3=36876:V=36878:
          POKEV,15:A=70
360 S1=36874:S2=36875:SC=0
365 R1=36864:R2=36865:R3=36866:R4=36867
370 FORU=38884TO38905:POKEU,0:NEXT
375 RETURN
380 POKE36879,14
385 PRINT"■■■
```

```
RINT#4,"  PROGRAM";
300 PRINT#4,"          K";:PRINT#4,"   SI
DE"
310 PRINT#1,"M",0,0-600
320 CLOSE1:CLOSE2:CLOSE3:CLOSE4
330 OPEN7,6,7:PRINT#7
340 CLOSE7


100 OPEN1,6,1:OPEN4,6:OPEN3,6,3:OPEN2,6,
2
110 PRINT#2,0:PRINT#1,"M",0,320
120 PRINT#1,"D",479,320
130 PRINT#1,"D",479,0-200
140 PRINT#1,"D",0,0-200
150 PRINT#1,"D",0,320
160 PRINT#1,"H"
170 PRINT#1,"D",479,0
180 PRINT#1,"D",479,0-70
190 PRINT#1,"D",0,0-70
210 PRINT#1,"M",0,0
220 FORT=20TO280STEP20
230 PRINT#1,"M",0,T:PRINT#1,"D",479,T:NE
XTT
240 PRINT#1,"M",240,320:PRINT#1,"D",240,
0
250 PRINT#2,3:PRINT#1,"M",0,295
260 PRINT#4,"  SIDE 1              ":PRIN
T#4,"  SIDE 2"
310 PRINT#1,"M",0,0-600
320 CLOSE1:CLOSE2:CLOSE3:CLOSE4
330 OPEN7,6,7:PRINT#7
340 CLOSE7
```

SIDE 1	SIDE 2

```
130 PRINTCHR$(X)
140 T=TI
150 GETA$:IFA$="" "THEN150
160 IFA$<>CHR$(X)THEN150
170 Q=(TI-T)/60
175 A=(INT(.5+(100*Q)))/100
180 PRINT"■■■■■■■YOUR TIME"
185 PRINT"■■■■■■■"A"SECONDS":FORI=1TO1000:NEXTI
200 J=J+A
205 H=H+1
210 IFA<FTTHENFT=A
213 IFA>STHENS=A
229 FORI=1TO1000:NEXTI:N=N+1:IFN=<GTHENGOTO90
230 PRINT"□"
231 PRINT"       ■WELL DONE■"
232 PRINT"        ■"E$"■"
235 PRINT"YOUR AVERAGE TIME WAS"J/H" SECONDS"
236 PRINT"YOUR FASTEST TIME WAS"FT "SECONDS"
237 PRINT"YOUR SLOWEST TIME WAS"S "SECONDS"
240 PRINT"ANOTHER GO?(Y/N)"
245 GETA$:IFA$=""THEN245
250 IFA$="Y"GOTO40
260 IFA$="N"THENPRINT"    ■■BYE BYE "E$"■":END
270 PRINT"I SAID Y OR N":GOTO240
```

Sketch

This program from Richard Barton in Essex requires a 64 with Simon's Basic and a light pen

THIS IS a drawing program for the 64 with a light pen and Simon's Basic.

There are three options which are permanently displayed; 1, draw; 2, undraw; 3, clear the screen.

The program when RUN starts in draw mode. In line 90 a formula adjusts the light pen's returned values (x and y) to align with the screen. These values have been set for a CBM1701 monitor and may need to be adjusted for a TV.

Lines 40 to 76 set up the display. Line 80 waits for the light pen trigger to be "on". Lines 100, 103 and 105 select options from the menu. Line 110 prevents off-screen values being plotted. Line 120 actually does the plotting.

```
10 REM HI-RES LIGHT-PEN SKETCH-PAD.
15 REM REQUIRES LIGHT-PEN.
16 REM WRITTEN IN SIMON'S BASIC.
18 REM RICHARD BARTON(1984)
20 COLOUR5,1
25 P=1
30 HIRES2,1
40 LINE0,180,320,180,1
50 LINE270,185,315,185,1:LINE315,185,315,195,1:LINE315,195,270,195,1
60 LINE270,195,270,185,1
61 LINE170,185,215,185,1:LINE215,185,215,195,1:LINE215,195,170,195,1
62 LINE170,195,170,185,1
65 LINE70,185,115,185,1:LINE115,185,115,195,1:LINE115,195,70,195,1
66 LINE70,195,70,185,1
70 CHAR271,187,3,1,1:CHAR277,187,12,1,1:CHAR283,187,5,1,1:CHAR289,187,1,1,1
72 CHAR296,187,18,1,1:CHAR308,187,19,1,1
73 CHAR171,187,3,1,1:CHAR177,187,12,1,1:CHAR183,187,5,1,1:CHAR189,187,1,1,1
74 CHAR196,187,18,1,1:CHAR208,187,4,1,1
75 CHAR71,187,4,1,1:CHAR77,187,18,1,1:CHAR83,187,1,1,1:CHAR89,187,23,1,1
76 CHAR108,187,4,1,1
80 TC=PEEK(653)AND4:IFTC=0THEN80
90 X=PENX*2-42:Y=PENY-48
100 IFX>270ANDX<320ANDY>185ANDY<200THEN25
103 IFX>170ANDX<220ANDY>185ANDY<200THENP=0
105 IFX>70ANDX<120ANDY>185ANDY<200THENP=1
110 IFX<0ORX>320ORY<0ORY>180THEN80
120 PLOTX,Y,P:GOTO80
```

Medians +

Two short programs for the unexpanded Vic from PH Armstrong of Caterham

MEDIANS enables you to find the average of a string of numbers using the median method. Angle Sums calculates and displays information about regular polygons, given the number of sides in the shape.

```
1 POKE36879,92
2 GOSUB1000
5 PRINT"■WHAT IS YOUR NAME?":INPUTA$
6 PRINT"■PLEASE ENTER NO. OF   SIDES THE SHAPE HAS■■■■■■■■■■■■■■";A$
10 INPUTN
20 A=N:PRINT"ANGLES=";A:PRINT
30 S=N:PRINT"SIDES=";S:PRINT
50 T=N-2:PRINT"TRIANGLES=";T:PRINT
60 D=180*T:PRINT"DEGREES=";D
70 POKE36878,15
80 FORL=1TO100
90 POKE36876,INT(RND(1)*128)+128
100 FORM=1TO10
110 NEXTM:NEXTL
120 POKE36876,0:POKE36878,0
130 FORT=1TO2000:NEXT:GOTO2000
1000 PRINT"■■■■■■ANGLE SUMS■"
1010 PRINT"■■■WHEN YOU ENTER"
1020 PRINT"A NO. OF SIDES"
1030 PRINT"THIS PROGRAM WILL"
1040 PRINT"GIVE YOU DIFFERENT"
1050 PRINT"INFORMATION ABOUT IT"
1060 PRINT"■■■■■■■■■■■■■■■■■■HIT A KEY■"
1070 GETD$:IFD$=""THEN1070
1080 RETURN
2000 PRINT"■■■■HIT 'SPACE'"
2010 GETA$:IFA$=""THEN2010
2030 IFA$=" "THENGOTO6
```

Program 1; Angle Sums

```
5 PRINT"■"
6 PRINT"■■■■■■■■MEDIANS"
7 PRINT"■■■■■■■■*******"
8 PRINT"■■■■■BY P.H.ARMSTRONG"
9 PRINT"■■■■■■■■■■■■■■■HIT A KEY"
10 GETA$:IFA$=""THEN10
12 PRINT"■HOW MUCH DATA TO BE":PRINT"ENTERED?"
14 INPUTZ$
16 S=VAL(Z$)
18 DIMA(S):PRINT"■"
20 FORN=1TOVAL(Z$)
30 INPUTA(N)
40 NEXTN
50 FORH=1TOS-1
60 FORN=1TOS-1
70 IFA(N)<A(N+1)THEN90
80 B=A(N):A(N)=A(N+1):A(N+1)=B
90 NEXTN
100 FORN=1TOS:NEXT
110 PRINT"■THE■ ■MEDIAN■=";A(N/2):FORT=1TO2000:NEXT:RUN
```

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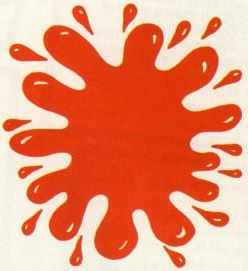

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Clubbing together with Commodore users

News of the latest computer clubs and a chance to check on your local ICPUG-affiliated group

THIS MONTH we are reprinting the list of ICPUG-affiliated groups first seen in February's issue.

The Independent Commodore Products Users' Group is a national amateur club run by its members. It publishes a regular newsletter and holds a large library of public domain software. ICPUG is always interested in hearing from people who want to join local groups or form their own clubs. Further details should be obtained from Jack Cohen, 30 Brancaster Road, Newbury Park, Ilford, Essex, IG2 7EP.

Two new groups have contacted *Commodore Horizons*. The first is Club 64, which operates in Dublin.

Club 64 is a Commodore 64 software user group. Brendan Conroy, the organizer, tells us that the range of services which the club will offer has not yet been fully decided.

"It should be noted," Brendan continues, "that we have a particular interest in hearing from users who cannot attend club meetings because they live in remote areas or do not have free time. We have already established a library of high quality public domain software programs, most of which have been checked and debugged. Ten disks are available with between ten and fifteen programs per disk. We hope to add two disks per month and hopefully bring out a news letter."

All 64 users with disk drives are invited to make use of the library, at a charge of £5 per disk for materials and copying costs, postage and packing. The group is non-profit making, and hopes to expand into tape programs soon.

Club 64 is interested in obtaining news, information, programs and other 64 related material. Contact Brendan Conroy, c/o 85 Upper Drumcondra Road, Dublin 9, Irleand.

Next we hear from the oddly named Compute-a-Frog. The school computer club of the College Pierre Dubois, Laval, France, is looking for pen-pals. The club consists of 11 to 15 year olds interested in all aspects of Commodore computing. Teachers are welcome to correspond too!

So if you want to brush up on your French at the same time as you polish your Basic, write to F J Bayard, The French Connection, Section 'Patamatique, College Pierre Dubois, 71 Rue Victor Boissel, 53017 Laval, France.

Berkshire: Brian Jones, Mathematics and Computing Department, Slough College of Higher Education, Wellington St, Slough, Berks. Telephone Slough 34585 ext 81, home (0734) 661494.

Derbyshire: Ray Davis, 105 Normanton Rd, Derby, Derbyshire. Telephone (0332) 41025. Meet at Derby Professional Colour, Osmaston Rd, Derby at 7.00pm.

Dorset: Bournemouth and Poole Independent Commodore Products User Group. Douglas Shave, chairman, 97 Canford Cliffs Rd, Poole, Dorset.

Essex: Walter Green, 151 The Hatherley, Basildon, Essex.

Essex: A G Surridge, 97 Shelley Rd, Chelmsford, Essex.

Gloucestershire: Mrs Janet Rich, Rose Cottage, 20 Old Court, Spring Hill, Cam, Gloucester, GL11 5PF. Telephone (0453) 47708. Meet informally at the above address on the last Friday of each month.

Gloucestershire: Mrs Alison Schofield, 78 Hesters Way Rd, Cheltenham. Telephone (0242) 580789 or (0242) 27588. Meet on the last Thursday of each month at Cheltenham Ladies College, Archway Entrance, St Georges St, Cheltenham.

Hampshire: Tony Cooke, 7 Russell Way, Petersfield, Hants, GU31 4LD. Telephone Petersfield 62840. Meet on the second Tuesday of each month at Bedales School, Petersfield at 7.30pm.

Hampshire: North Hants Regional Group. Ron Geere, 109 York Rd, Farnborough, Hampshire, GU14 6NQ. Meet every third Wednesday of each month at 70 Reading Rd, Farnborough, Hampshire.

Hampshire: Tony Cox, 10 Staplers Reach, Rowner, Gosport, Hampshire, PO13 0EY. Telephone Fareham 280530. Meet at Gosport Community Association, Bury House, Bury Rd, Gosport, Hants, PO12 3PX, at 7.00pm.

Hertfordshire: Hert/Stevenage Regional Group. Brian Grainger, 73 Minehead Way, Stevenage, Herts. Telephone (0438) 727925. Meet informally on the last Wednesday of each month at the Provident Mutual Assurance, Purwell Lane, Hitchin, Herts.

Hertfordshire: Herts/Watford Regional Group. Stephen Rabagliati, c/o Institute of Grocery Distribution, Grange Lane, Letchmore Heath, Watford, Herts. Meet on the second Monday of each month at the above address.

Kent: South East Regional Group. Wing Commander Mick Ryan, 164 Chesterfield Drive, Riverhead, Sevenoaks, Kent. Meet on the third and fourth Thursday of each month at Charles Darwin School, Jail Lane, Biggin Hill, Kent, at 7.30pm.

Kent: Ron Moseley, Rosemount, Lord Romney Hill Weavering, Maidstone, Kent. Telephone (0622) 37643. Meet on the first Wednesday of each month at 7.45pm.

Lancashire: David Jowett, 197 Victoria Rd East, Thornton-Cleveleys, Blackpool, Lancs. Meet every third Thursday at Arnold School, Blackpool. Telephone Cleveleys 86108.

Lancashire: John Ingham, 72 Ardwick St, Burnley, Lancashire, BB10 1BJ. Trying to form a Vic group.

London: Barry Miles, Business Studies Department, Polytechnic of North London, Holloway Rd, London W7. Pet group of the ACC which meets every other Tuesday at the Polytechnic at 6.00pm.

London: Michael Franks, 196 Castellain Mansions, Castellain Rd, London W9. Telephone 01-286 0650 or 01-839 7811.

Merseyside: Merseyside Commodore Users' Group. Jeff Jones, chairman, 41 Virginia Ave, Lydiate, Merseyside, L31 2NN. Telephone (051) 526 4813. Meet on alternate Wednesdays at Maghull Deyes High School, Liverpool, at 7.30pm.

Middlesex: Geoff Squibb, 108 Teddington Park Rd, Teddington, Middlesex. Telephone 01-997 2346.

Norfolk: Peter Petts, Bramley Hale, Wretton, Kings Lynn, Norfolk.

Northumberland: Graham J Saunders, Starling House, 22 Front St, Guide Post, Choppington, Northumberland. Telephone (0670) 823242.

Oxfordshire: Ian Blyth, 40 Wilmot Close, Witney, Oxon, OX8 7NL. Telephone Witney 5171 or 3671.

Suffolk: Alan Morris, 30 Kelso Rd, Bury St Edmunds, Suffolk. Telephone Bury St Edmunds 61870. Meet at The Coach House, Long Brackland, Bury St Edmunds, Suffolk.

Surrey: Arthur T Oram, 7 Box Ridge Ave, Purley, Surrey, CR2 3AR.

Warwickshire: Coventry and Warwickshire Commodore Computer Club. Will Light, 22 Ivybridge Rd, Stytechale, Coventry, Warwickshire. Telephone (0202) 413511. Meet at Stoke Park School and Community College, Coventry, on the fourth Wednesday of each month at 7.00pm. Please note that no meetings are held in July, August or December.

West Midlands: West Midlands Vic Users' Group. Joe Bowman, 6 The Oval, Albrighton, West Midlands. Meet monthly. Provides a free program library and advice on hardware and software for members of the club. Send a large SAE for information.

Yorkshire: Bob Wood, 13 Bowland Crs, Ward Green, Barnsley, South Yorkshire.

Northern Ireland: David Bolton, 19 Carrickburn Rd, Carrickfergus, County Antrim, BT38 7ND, Northern Ireland.

Scotland: Dr Jim MacBrayne, 27 Paidmyre Crescent, Newton Mearns, Glasgow, Scotland. Telephone (041) 639 5696.

Scotland: John Smith, 19 Brewlands Rd, Symington, Kilmarnock, Ayrshire, Scotland. Telephone (0563) 830407. Meet on the first and third Thursday of each month.

Wales: Simon Kniveton, Penpompren Hall, Talybont, Dyfed. Just forming.

Wales: F J Townsend, The Hill, Rhydowen, Llandyssul, Dyfed, SA44 4QD. Telephone (05455) 5291.

If you want your club mentioned on this page write to Clubnet, Commodore Horizons, 12-13 Little Newport Street, London WC2R 3LD

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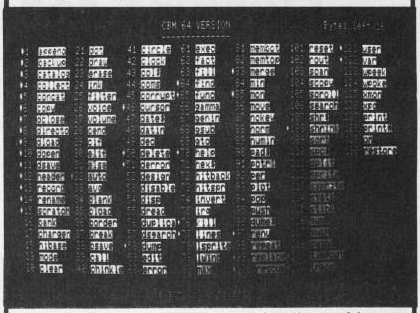

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Strategy and tactics

REJUVENATED

Commodore has shifted into a higher gear now that Marshall Smith is established as the new driving force. But there are still indications that while the Commodore machine is running better now than it has for some time, it's not that sure in what direction it's supposed to be heading.

On the home computer front, the strategy seems unclear. The £70 16K 116 model appeared along with the 264 at the Hanover Computer Fair, but while American consumers should see the 116 in the second half of 1984, it's unlikely to be seen in Europe.

The 264 was announced back in January, and is seen by everyone apart from Commodore as the logical if more expensive successor to the 64; but there is still no clue to the likely launch date, which was first late Spring, then June, and now appears to have been put off again.

But it seems that Commodore is in no hurry to retire the ageing 64 or the even more veteran Vic 20. Any number of newer rivals like the Advance 86a, the Sinclair QL, Alan Sugar's new South Korean (sorry, British) Amstrad and even, some think, the Apple II portable make Commodore's present range look very old-fashioned.

At Hanover, Commodore unveiled a host of new peripherals such as touch screen, mouse cursor, light pen and printers to give the 64 and Vic 20 a new lease of life — and delay their replacement.

The news from the US 'mass merchandise' outlets suggests that these tactics may be justified. Commodore's home computer production capacity is sold out till the end of June, there are now 15,000 stores carrying the 64 and most retailers are making more money out of the 64. Though the basic price of the 64 at K-Mart is down to 189 dollars, typical customers are spending 450 dollars to buy a worthwhile system.

In Commodore's new stomping ground, portable IBM compatibles, the thinking looks much clearer and the machine much more competitive. Doug Cayne, analyst at investment bankers Dillon Read Technology, expects Commodore to sell the Bytec Hyperion at around 2000 dollars, more than 30% below a comparably equipped Compaq or the new 2795 dollar IBM portable.

It's not just the pricing that appeals to him. Says Cayne: "The Hyperion is one of the best portable designs on the market, but despite its technical excellence, the product has been relegated to obscurity due to Bytec's lack of manufacturing, marketing and distribution skills. Commodore's strengths in these areas should make their version of the Hyperion a winner.'

The confidence in the Hyperion doesn't look misplaced: it's as compatible with the IBM PC as any other rival and in basic form, more powerful, more attractive and 10 pounds lighter than the Compaq and other portables.

Cayne thinks Commodore can build a Hyperion for less than 750 dollars and on a wholesale price of 1500 dollars, 'it will be one of the most aggressively priced compatibles, while still giving Commodore excellent profit margins and room to slash prices still further.'

No details were given at Hanover on delivery dates for the Commodore Hyperion but Cayne foresees a European launch before the machine arrives in the States towards Christmas, potentially priced "as low as 1,500 dollars, which would make it far and away the best value among IBM-compatibles."

Commodore will also be able to compete in the field of Unix operating machines — the 16-bit Z8000 business computer was also seen for the first time at Hanover.

It seems that Commodore has the equipment to compete, especially in the potentially more rewarding PC market.

What's not so clear is whether the overall strategy is sufficiently coherent.

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ANSWER BACK

Function ideas

I HAVE a 64 and a copy of the Programmer's Reference Guide. The problem is that there is no mention of the Function Keys. What do they do, and how do you make them do it?
E Boyle
Ashington
Northumberland
THE FUNCTION keys are provided as special keys to be programmed by you, either in Basic or in machine code. All they do is to generate an ASCII code when pressed; values are F1, 133; F2, 137; F3, 134; F4, 138; F5, 135; F6, 139; F7, 136; F8, 140.

Try this short program.

```
10 PRINT "[CLR]MENU"
20 PRINT "[RVS]F1[RVS OFF]KEY"
30  "      "F2      "      "
40  "      "F3      "      "
50  "      "F4      "      "
60  "      "F5      "      "
61  "      "F6      "      "
62  "      "F7      "      "
63  "      "F8      "      "
69 GETAS:IFAS = ""THEN69
70 A = ASC(AS):IFA<133ORA>140
THEN69
80 A = A-132
90 ONAGOTO91,92,93,94,95,96,97,98
91 PRINT"YOU PRESSED F1":END
92  "      "      "      F3    "
93  "      "      "      F5    "
94  "      "      "      F7    "
95  "      "      "      F2    "
96  "      "      "      F4    "
97  "      "      "      F6    "
98  "      "      "      F8    "
```

Mode of address

I HAVE a 64, a 1520 printer – plotter and 1541 disk drive with Easy Script. I am unable to output from the word processor using the printer.

Is this because, according to the manuals, the address of the 1520 is 6, while that of the other Commodore printers is 4 or 5? Is there any way to overcome the problem?
Peter Guise
Baughirst
Hants
SELECT the CBM (0) option in the start up menu, then press F1. Next press O for output and D for device number. Enter 6 then press RETURN. If you've nothing to print, press RETURN again to exit. This will set the printer device number to 6 until you exit from Easy Script.

Merging ahead

COULD YOU tell me if there is any way of "merging" listings on the 64, as there is on the Spectrum? I have got into the habit of entering programs in sections, and getting each to work before starting on the next. It would be most helpful to be able to save each section on tape then merge when all are working.
J D W Sumner
Bratton Fleming
Devon
YOU SHOULD contact Supersoft, who produce a merge program costing £9 + VAT on disk or £7 + VAT on tape. Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex, phone 01-861 1166.

Double height

COULD YOU tell me how to produce double height letters on my Vic 20 and Super Expander — if, indeed, this is possible.
Andrew Herberts
Nottingham
YOU MUST first define your own character set in memory; refer to pages 215 – 216 of the Vic 20 Programmers' Reference Guide for details. Then POKE 36867, PEEK (36867)OR1 will enable you to use them.

Usable control

RECENTLY, I accidentally pressed the CTRL key while listing a program on my 64. I found that this lists the program one line at a time. However, I'm worried that this may affect the program — can you advise me?

Secondly, how can I find out how much useable memory is left?
Mark Gratton
Alsager
Stoke-on-Trent
THIS IS a useful feature of the 64 dand will certainly not harm your program!

To find out how much memory is left use the following in direct mode — PRINTFRE(0)—(FRE(0)<0) *6536

Disabling keys

COULD YOU tell me how to go about disabling keys on the 64? The facility to disable such keys as INST – DEL, CLR HOME, the cursor keys and the CBM logo key would be very useful in input statements.
Andrew Key
Woking
Surrey
RUN – STOP and LIST are easily disabled by pokes which change the vector address. Using machine code, one way is to divert the CHRGET routine to your own routine which would ignore the required keywords.

For Basic programmers, I suggest you use GET instead of INPUT, provided that you don't have an enormous amount of strings created which would give you garbage collection problems. This routine will show you the general principles;

```
100 LS = "[CLR]ANYTHING":L = L-
EN
(LS):PRINTLS
110 POKE655,97:GOSUBB500:POKE
655,72
120 PRINT "[CLR]"İNS
130 END
500 INS = "":PRINTAB
(L + 1)CHRS(145);
510 GETAS:IFAS = ""THEN510
520 IFPEEK(653) = 2THEN510
530 IFASC(AS) = 20ORASC(AS) = (14-
8)
THEN510
540 IFASC(AS) = 190RASC(AS) = (14-
7)
THEN510
550 IFASC(AS) = 13THENRETURN
560 PRINTAS;
570 INS = INS + AS:GOTO510
```

The POKEs to location 655 disable the simultaneous pressing of the Commodore key and the shift key within the input routine. Line 520 disables the Commodore key when used with graphics. To disable the CTRL key use 4 instead of 2, and for the shift key use 1. Input is terminated by pressing RETURN.

Using this method gives full control of inputs. A maximum word length can be forced by using say

```
565 INS = INS + A$
```

and replacing the next line with

```
570 IFLEN(INS) = 6THENRETURN
580 GOTO510
```

Power problems

THE TRANSFORMER for my 64 recently stopped working, and it has taken so long to get it repaired that I now want to obtain a spare.

I can't find a reference to the output of the unit. Could you tell me what it is, and how the plug into the computer is wired?
David Meadows
Yeovil
Somerset
THE OUTPUT is 5 volts DC, 8.5 watts — for the wiring diagram, check in the back of the Programmers' Reference Guide for the 64.

Upper, lower

CAN YOU tell me if there is any way to produce both upper and lower case letters using my Commodore 64, at the same time? I want to start sentences using capital letters and write the rest in lower case, as is normal literary practice.
Jon Knill
Bracknell
Berks
IT'S QUITE simple — the 64 powers up in upper case – graphics mode. To change to upper case – lower case mode just press the CBM key and shift. You can then type in upper and lower case using the shift key as with a typewriter.

8K Vic

COULD YOU supply the memory locations used in the Vic with 8K expander?
Mark Stockil
Ormesby
Cleveland
THE START of the screen memory moves to 4096 ($9400), and the start of the Basic text area moves to 4609 ($1201).

If you need help with a technical query or problem write to Jack Cohen, Commodore Horizons, 12-13 Little Newport Street, London WC2R 3LD

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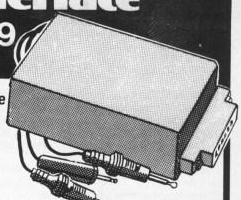

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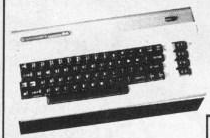

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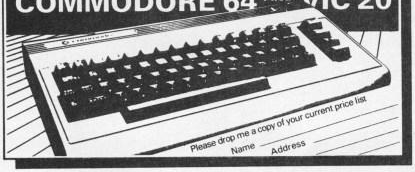

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Simply tell us the number of nudges for each button in the order 1,2,3,A,B,C, then complete the tie-breaker.

This month there will be four competition winners, so the odds have increased in your favour. Richard Shepherd Software is offering four complete sets of its Commodore 64 packages as prizes, total value £250: Transylvanian Tower, Super Spy, Everest Ascent, Ship of the Line and Urban Upstart — plus the Cash Controller business package.

And you're also given a choice between cassette and disk formats, so let us know which you would prefer when you send in your entries.

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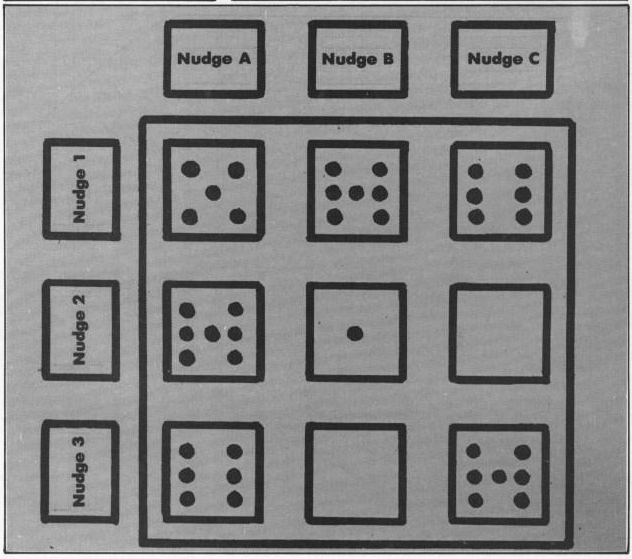
The winner of May's competition is Adrian LaGarde of Camberley, Surrey. Adrian's prize is the Valiant Designs Turtle and Commodore's Logo package.

Send your answers to Competition Corner, Commodore Horizons, 12-13 Little Newport Street, London WC2R 3LD — to arrive no later than the last working day in the month on the cover of this issue. The name of the winner, and the solution to the puzzle, will be published in the issue after next.



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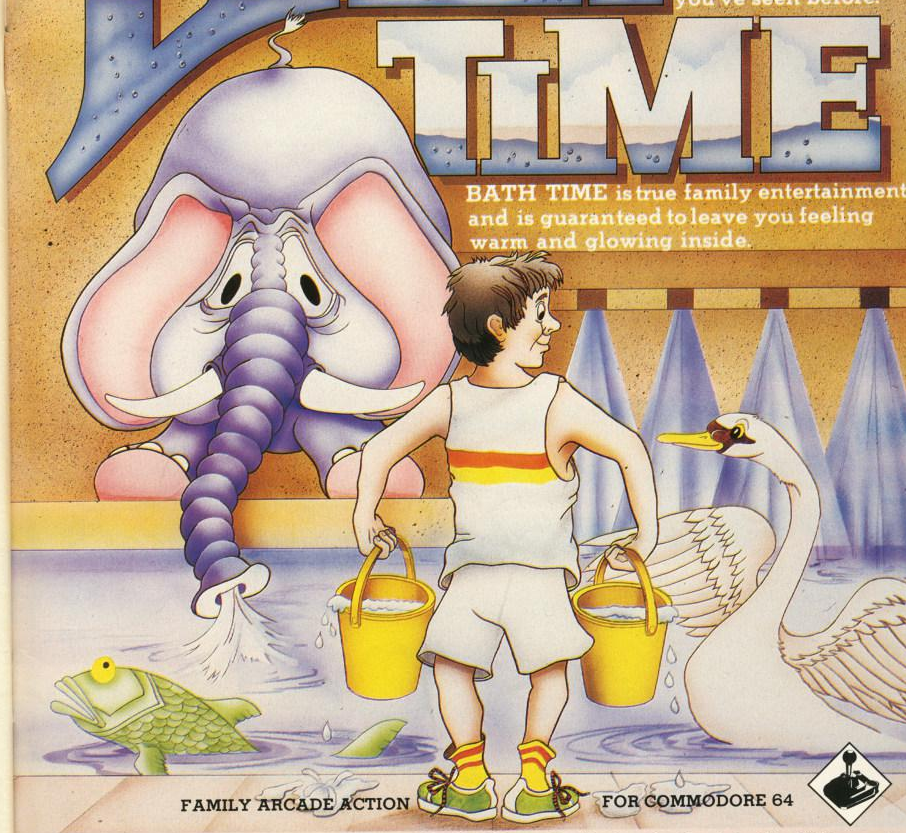

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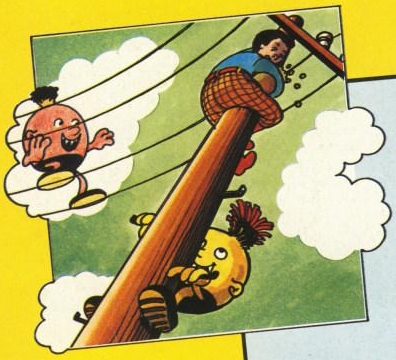

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